INDIA RUBBER WORLD

OUR 62nd YEAR

A BILL BROTHERS PUBLICATION

SEPTEMBER, 1951

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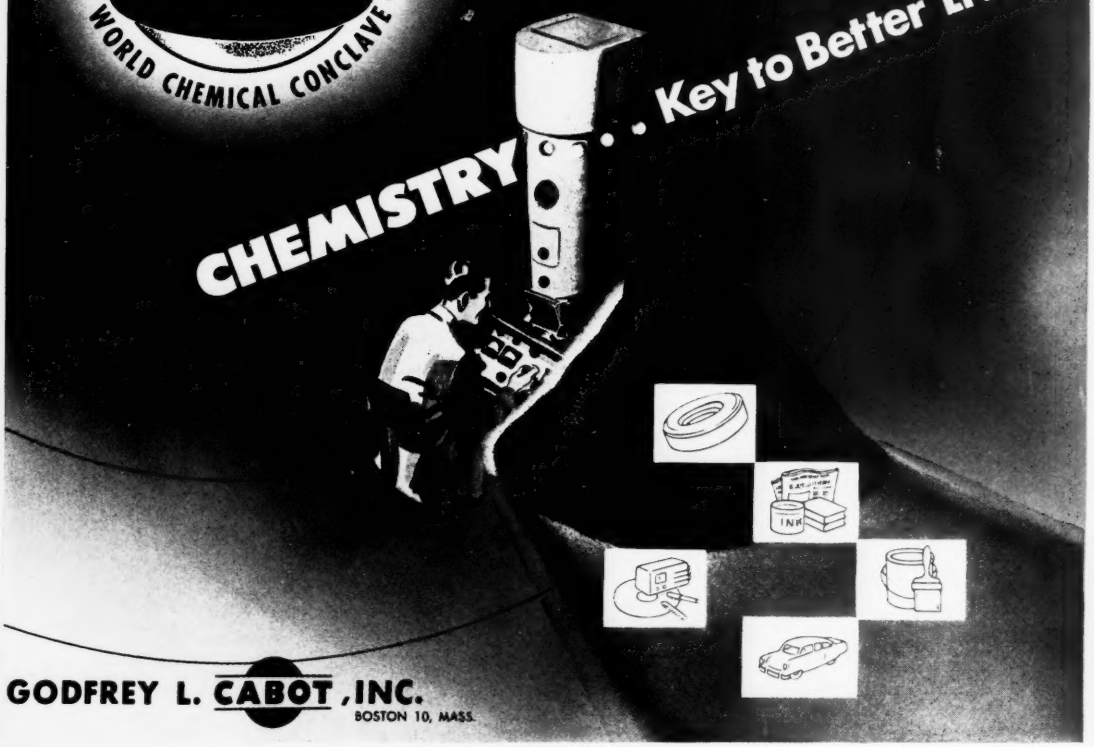
CHEMISTRY . . . Key to Better Living



GODFREY L. CABOT, INC.
BOSTON 10, MASS.

WHAT ENTHUSIASTIC USERS SAY ABOUT

RR-10

Du Pont's new reclaiming agent

- *"We've tried RR-10 and the results are excellent. It looks especially good in Banbury reclaiming."*
- *"We've found RR-10 an effective remedy for bringing back scorched neoprene stocks."*
- *"RR-10 is outstanding in straight GR-S scrap and does an excellent job in the pan process."*
- *"0.1 to 0.3 part of RR-10 in natural and up to 0.6 part in GR-S produces high quality reclaim in both cases."*
- *"One percent RR-10 does a real job in reclaiming mixtures of GR-S and high styrene resins."*
- *"RR-10 works very well in our special Banbury reclaiming operation."*

The above comments by present users of RR-10 are indicative of the job it is doing in a variety of reclaiming operations. If you're making reclaim and haven't tried this new and better reclaiming agent, don't fail to do so. See your Du Pont representative or write us for samples and literature on its use.

BRANCH OFFICES:

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Boston, Mass.	140 Federal St.	HAncock 6-1711
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E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

DU PONT

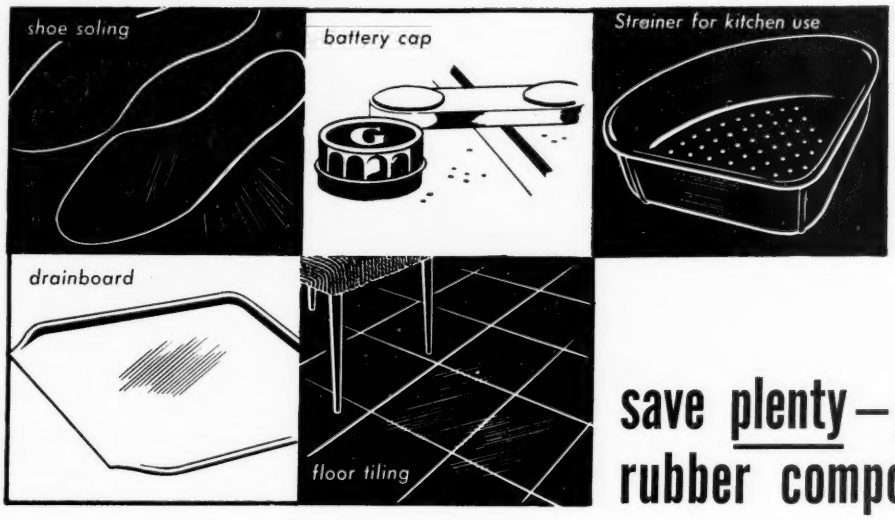
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

INDIA RUBBER WORLD, September, 1951, Vol. 124, No. 6. Published Monthly by BILL BROTHERS PUBLISHING CORP., Office of Publication, Orange, Conn., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Orange, Conn., under the act of March 3, 1879. Subscription United States and Mexico, $3.00 per year; Canada $4.00; All Other Countries $5.00; Single Copies 35 Cents. Address Mail to N.Y. Office.

TECHNOLOGY DEPT.

News about

B. F. Goodrich Chemical Company *raw materials*



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DETROIT

save plenty—get improved rubber compounding, too!

...with Good-rite RESIN 50

HERE'S an easy-processing, reinforcing agent that cuts rubber compounding costs—and helps you get improved finished products.

First big advantage of Good-rite Resin 50 is that it provides a new and simple compounding approach to hardness problems. As an example—it's a means of filling in the gap between soft rubber compounds and ebonites.

Good-rite Resin 50 brings *more* advantages. It saves time by eliminating masterbatching. Your rubber compounds gain better flex life, higher elongation, improved abrasion resistance. They are more easily handled because Resin 50 acts as a plasticizer at processing temperatures.

For extruded shapes such as gaskets, tubing, coving, etc., especially on hard compounds, Resin 50 provides improved surface smoothness and superior processing characteristics in the extruder.

A white, free-flowing powder, Good-rite Resin 50 can be compounded in a wide range of colors. Send for technical information. Find out how Good-rite Resin 50 can give you *better* results at *lower* costs. Just write Dept. CB-5, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

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American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

Make tougher treads this low cost way

Team Philblack* O *with* Philblack* A!

Champion performance! For original treads, camelback, conveyor belt covers . . . wherever you need a tough, low-cost rubber compound, you can't beat mixtures of Philblack O and Philblack A, especially in a ratio of approximately two to one.

Such blends closely approach straight channel black compounds in tensile strength and are superior in flex life, abrasion resistance, heat buildup, compression set and resilience. Excellent with cold rubber!

Both Philblack O and Philblack A are shipped in either hopper cars or bags. Our Sales Service Laboratory in Akron is always anxious to help you analyze the results these Philblacks will give in your natural or synthetic rubber stocks.

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* A Trademark

Philblack A and Philblack O are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton.
West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

Naugatuck's

B-L-E 25

still sets the standard for rubber antioxidants

B-L-E 25 . . .

. . . . Provides maximum protection against flexing fatigue.

. . . . Protects against heat and oxidation.

. . . . Acts as an excellent stabilizer in the manufacture of GR-S synthetic rubber.

. . . . Insures rapid and complete dispersion, because it is a low viscosity liquid.

. . . . Proves itself through use in tires, belting, hose, molded products, mechanical goods, wire insulation.

PROCESS • ACCELERATE • PROTECT with NAUGATUCK CHEMICALS

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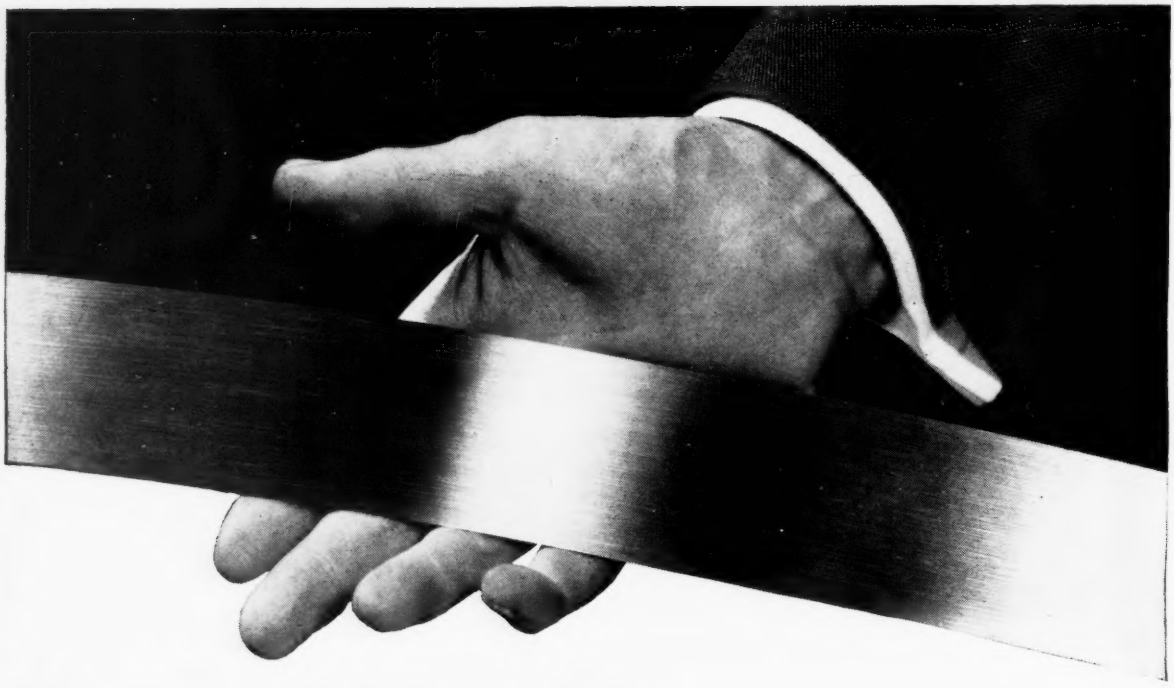

How temperamental can a piece of steel be?

● Plenty! Because steel is one of the most *versatile* of all materials, it can play tricks on you . . . can be mighty temperamental, even obstinate. But, properly controlled, it works for you precisely the way you want it to!

For generations, National-Standard's Athenia Steel Division has specialized in the behavior engineering of high carbon steel for the most exacting services. Here, they've learned how to take the fullest *advantage* of steel's versatility. It results in specially engineered, rigidly controlled steels that do a *better* job in all kinds of products from umbrella ribs and pen points to camera springs and piston rings.

Perhaps defense production brings you new problems in the application or behavior of steel. National-Standard and Athenia offer you the kind of engineering and development service that has speeded production and cut costs for many and many a manufacturer.

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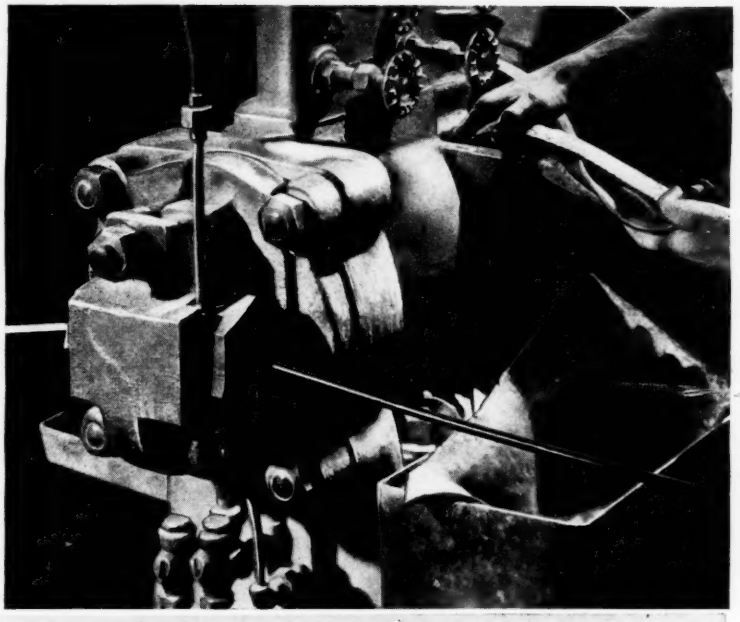
for easier processing

in insulation of electric wiring—

try PLIOLITE S-6B



CHECK THESE ELECTRICAL PROPERTIES

Specific Volume Resistivity

	test voltage	ohm-cm X 10^{14}
Dry	1.35	2
	14.75	30
Wet	1.35	4
	14.75	60

	1000 cycles	1 megacycle	60 megacycles
Dielectric Constant			
Dry	2.64	2.55	2.36
Wet	2.69	2.60	2.38
Power Factor %			
Dry	.033	.140	.100
Wet	.043	.040	.290
Loss Factor			
Dry	.00087	.00357	.00236
Wet	.00116	.00104	.00690

USE PROVED Products

Pliolite—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

EXTRUDERS of insulated wire and cable are finding that they can produce a high-quality product with PLIOLITE S-6B — Goodyear's high styrene butadiene copolymer for rubber reinforcement. And PLIOLITE S-6B brings easier processing, too — faster stock preparation in the Banbury or on the mill, faster, smoother extrusion, reduced shrinkage and permissible higher loading. Exactly centered thin-walled insulated wire is easier to produce when you turn to PLIOLITE S-6B.

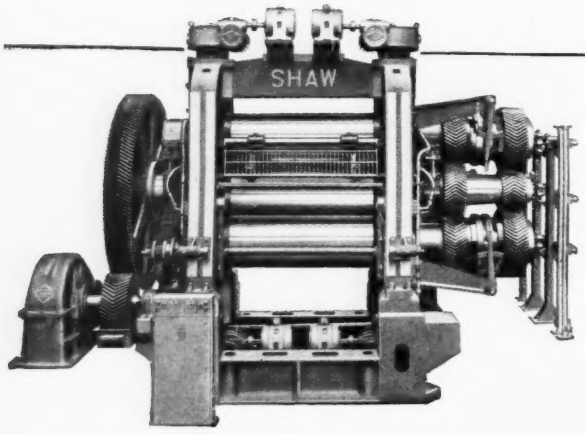
You'll find that PLIOLITE S-6B gives excellent electrical properties, as well as improved tensile, elongation, hardness and tear to the rubber. Its low gravity and light color are further advantages. The table here will show you the electrical properties PLIOLITE S-6B offers you—and laboratory tests will tell you the balance of the story.

Send now for full details and sample for evaluation, so that you'll be ready for the full availability of PLIOLITE S-6B when current shortages are overcome. Write today to:

Goodyear, Chemical Division
Akron 16, Ohio

GOODYEAR

KEEP IN STEP WITH THE TIMES



SHAW

In an industry as progressive as that of rubber manufacture, the engineer is constantly asked to accomplish the unknown, if not the 'impossible'. That is where SHAW experience of the whole field of rubber and plastics machinery comes in —with so many steps behind us, the next forward step comes readily to our enterprise.

A Three-roll Calender with four-motor individually power operated roll adjusting gear, push button controlled, hydraulic jacks fitted to maintain constant pressure on top roll bearings and adjusting gear.

Flood lubrication to roll bearings for high temperature work and reduction of maintenance.

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R. 199

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HARFLEX
TRADE MARK
PLASTICIZERS

The quality of a plastic is no better than the quality of the plasticizer used therein.

You can be sure of highest quality and consistent performance with HARFLEX PLASTICIZERS.

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SEBACATES

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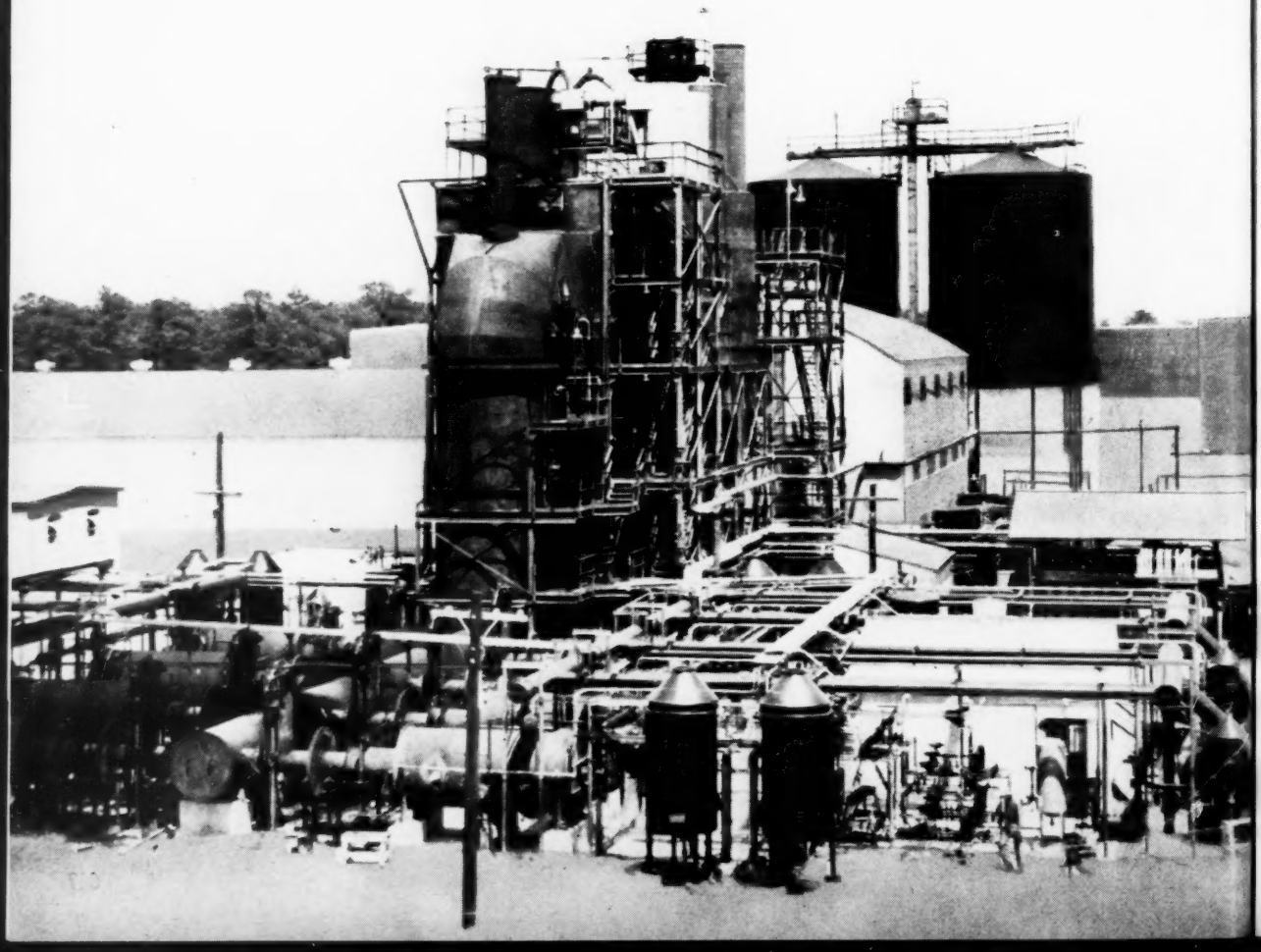

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NEW WITCO-CONTINENTAL Plant

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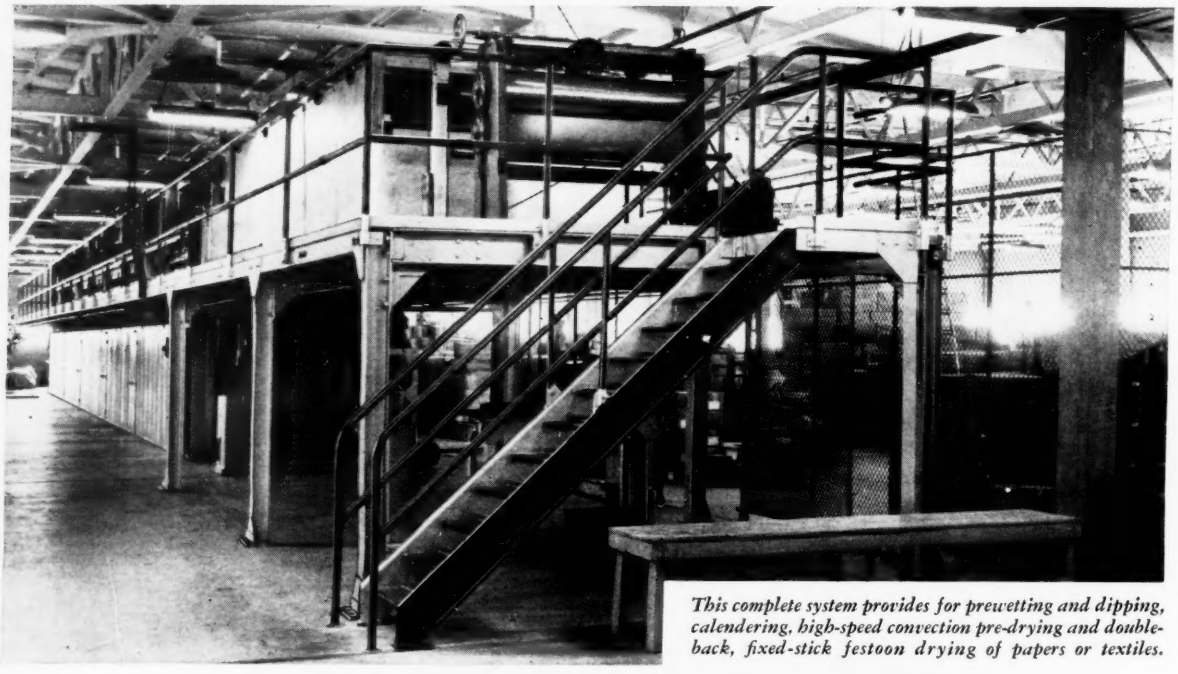
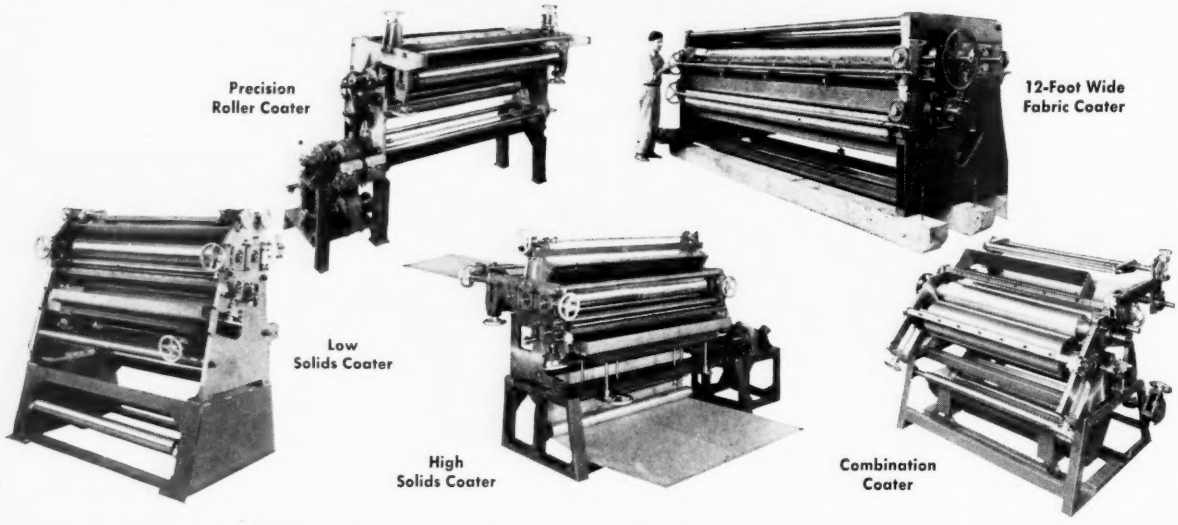
IOI Equipment for Coating Fabrics, Films and Foils with Organosols, Plastisols and Hydrosols



This complete system provides for prewetting and dipping, calendering, high-speed convection pre-drying and double-back, fixed-stick festoon drying of papers or textiles.



THE COATING SYSTEM and individual units shown here represent but a few examples of IOI's wide range of equipment for coating, combining and handling textiles, papers, films and foils. In addition IOI designs and manufactures letoffs, pull rolls, drying machines, system drives, etc., to augment existing equipment.

For complete information write for: "Continuous Automatic Processing Equipment", "Blueprint for Industry Part V, Coating and Handling Equipment for Textiles, Papers, Films and Foils" and "The Handling of Webs and Monofilaments."

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IOI ENGINEERING VERSATILITY

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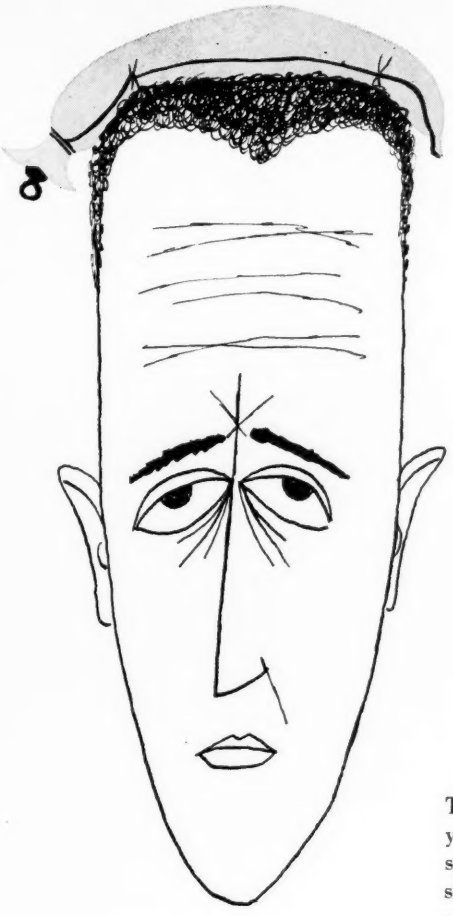

Wyandotte Bicarb cures a rubber headache

Take it from this rubber manufacturer, you need a good blowing agent to make good sponge rubber. Time was when he used straight bicarbonate of soda. Its irregular particle size caused uneven porosity in his finished product, and lumps formed during storage made it difficult to measure.

Then a Wyandotte representative dropped in and remembered that Wyandotte Better Blend Soda, a specially treated bicarbonate, had solved a similar problem of flowability and uniform particle size in the baking industry.

The manufacturer found that Better Blend Soda gave his sponge rubber even porosity and a better "skin," was free-flowing and non-caking — and less expensive than any other type of blowing agent.

Result: this manufacturer has easier handling, fewer rejects — a *better product* at *less cost*. He now uses Wyandotte Better Blend Soda in 95% of his sponge rubber. Why not write today to see how Wyandotte can help *you?*

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE
HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
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Wyandotte, Michigan • *Offices in Principal Cities*

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DU PONT ALAMASK ODORANTS GIVE
TRADE MARK
RUBBER PRODUCTS THE SNIFF THAT SELLS!

Customer appeal comes naturally to rubber products
when you use "Alamask" odorants...
"Alamask" makes that important difference,
the *sniff that sells!*

Here are just a few successful end uses of "Alamask" odorants:

Rug underlays: "Alamask" ND, "Alamask" AO

Foamed sponge pillow and mattress stock: "Alamask" O, "Alamask" OS

Shoe adhesives, from natural or synthetic latices: "Alamask" ND, "Alamask" BG, "Alamask" AF

Rug backings: "Alamask" LD, "Alamask" ND

Natural smoked sheet: "Alamask" O

And this is just a part of the information contained in our booklet... "Odorants for the Rubber Industry." Send for your copy today... or let us give you our recommendation for your individual problems. Write E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Aromatics Section, Wilmington 98, Delaware. Branch Offices: Atlanta, Boston, Charlotte, Chicago, New York, Philadelphia, Providence, San Francisco.

Du Pont **Alamask** odorants
TRADE MARK

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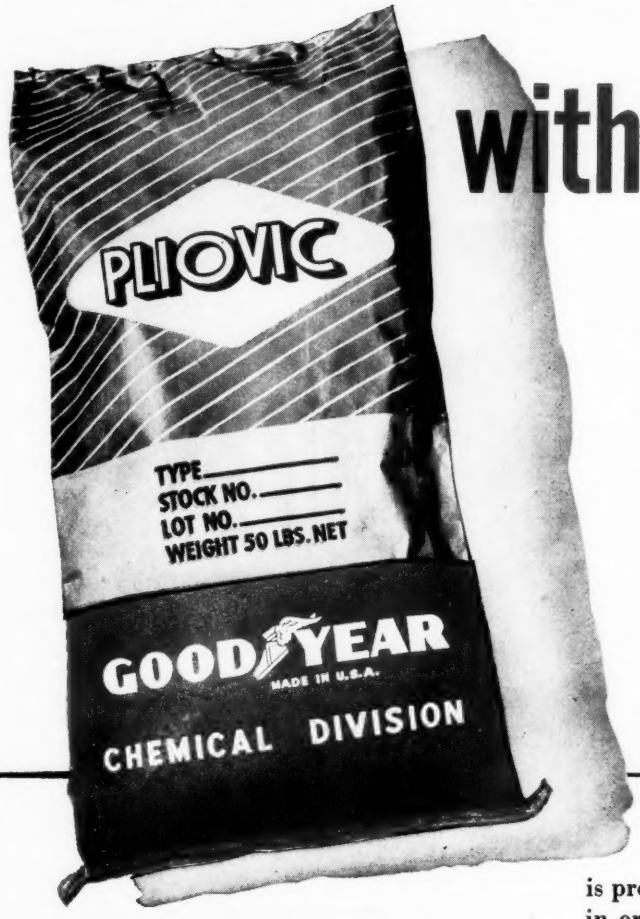
BETTER THINGS FOR BETTER LIVING ... *THROUGH CHEMISTRY*

Look what you get with PLIOVIC



High-Quality Vinyl Products—plus all these advantages:

- Easier processing
- Lower plasticizer requirement
- Lower processing temperatures
- Higher loading without sacrifice of physical properties

You can save on scarce plasticizers—cut your costs—maintain processability—and obtain strength, toughness, flexibility and other physical properties you want when you use PLIOVIC, Goodyear's vinyl chloride copolymer.

General-purpose PLIOVIC is being widely used in calendering, extrusion and molding applications. A special grade, PLIOVIC AO, is proving popular and is suggested for use in organosols.

PLIOVIC is currently in short supply, but now is the time to evaluate this use-proved resin—and plan to get the advantages PLIOVIC offers you as soon as you can. Write today for full details and sample for evaluation to:

Goodyear, Chemical Division,
Akron 16, Ohio

USE PROVED *Products*

GOODYEAR

Pliovic—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

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Saves You Golden Weeks of Production Time

Now more than ever you will find it profitable to have us rebuild your Banbury body and restore it to full efficiency.

Golden weeks of production time are saved you by our "Pre-Plan" Service. You have your Mixer thoroughly rebuilt and back in your line with the very minimum of "down time."

Wire or write us for a reservation now. Our facilities handle every size and type of Banbury and every job is guaranteed.

Today more than ever a worn, leaky Banbury is a liability. It is costly to operate and you face the serious risk of a complete breakdown.

Place your valuable mixer body in the qualified hands of veterans and specialists in Banbury rebuilding. Interstate Service has been perfected through more than sixteen years' experience. Estimates gladly furnished.

SPARE BODIES AND PARTS

We have No. 9 and No. 11 Banbury bodies for sale or interchange. These are complete with door and cylinder. We also have available, subject to prior sale, parts for most sizes of Banburys.

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EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

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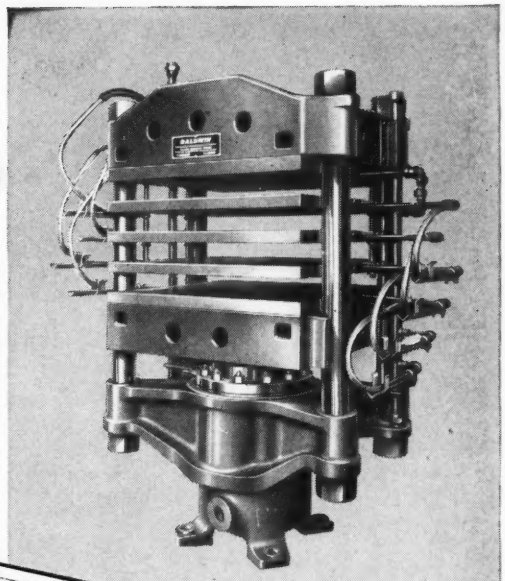
"Production-ize"

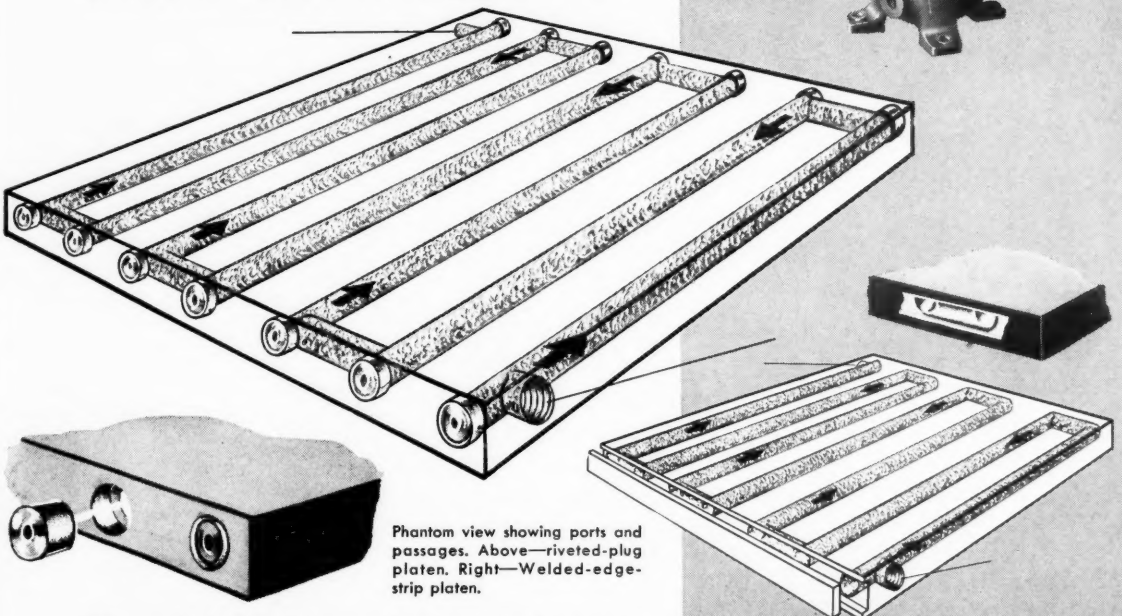
your steam platen presses with

BALDWIN

HEATING PLATES

scientifically ported for uniform surface temperature





Phantom view showing ports and passages. Above—riveted-plug platen. Right—Welded-edge-strip platen.

When you're looking for ways to boost output and cut rejects —look *first* at your heating plates. A hot-plate press is only as good as its platens. Unless you get uniform surface temperatures, you'll never get top production.

Baldwin heating plates are designed to provide this all-important uniformity . . . special manufacturing methods and equipment have been developed to produce passages of rifle-barrel accuracy, properly locate cross-ports, provide steam-seal plugs and attain smooth, parallel working surfaces. The results are showing up in users' shops—and are one reason why Baldwin Platen Presses are on the production lines of so many successful concerns.

When you are repairing or modernizing old presses—"production-ize" the equipment by installing Baldwin Steam Plates. Available in a wide range of sizes. Just specify your needs giving machine model and number.

Multiple-spindle automatic double-end drilling machine, designed and built in the Baldwin shop for drilling steam plates to close tolerances.

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Baldwin-Lima-Hamilton Corp.
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SHARPLES ACCELERATOR 57

ZINC diMETHYLdithiocarbamate

Available in *three forms* to meet your particular factory and compounding requirements.

SA 57-0 Powder form, untreated. Preferred by many for latex compounding.

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SA 57-9 Xtruded form. Treated with inert rubber-soluble binder. Free flowing, dustless, with improved dispersibility due to fine particle size of coated product.

Write Dept. P for samples, prices and technical information

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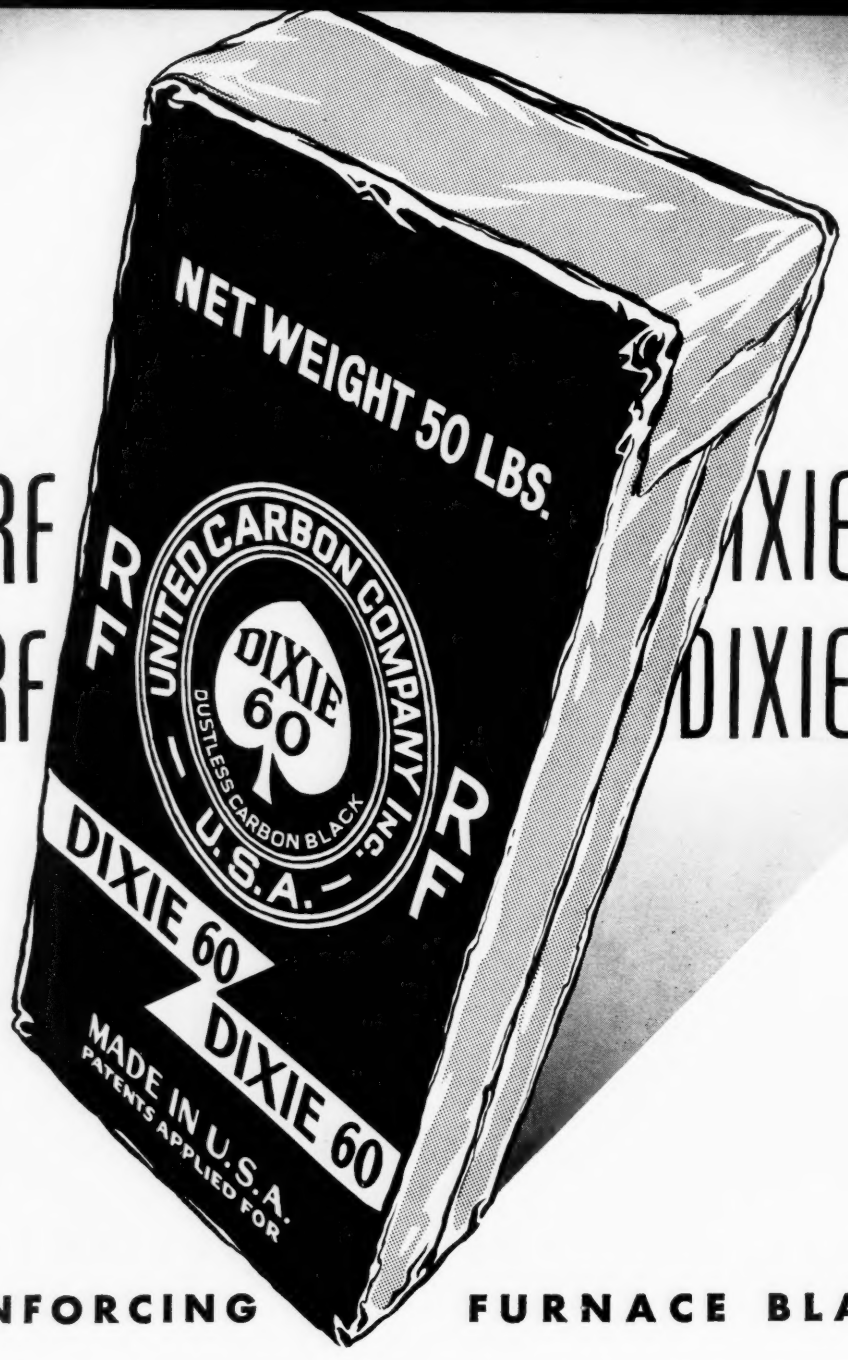
DIXIE 60 RF

DIXIE 60 RF



IXIE 60

IXIE 60

REINFORCING FURNACE BLACK

Dixie 60 (an R F black) is an extraordinarily good black because of the way it is made and what it can do. Created from a particular oil and under controlled heat and reactions in our own furnace process, Dixie 60 is fitted for easy and efficient processing, fast extrusion, less nerve, proper smoothness, tight cure, mighty reinforcement, high electrical conductivity and superb resistance to wear and flex crack cut-growth. Standardize on Dixie 60 to give your products the supremacy they deserve.

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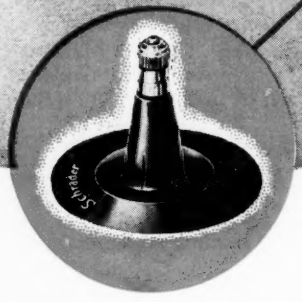

Tires that ride to work and play

Load the family in the car. Head for the beach, the country, or town or church . . . with never a fear about the tires. They're built to give protection for many miles of easy, economical driving. A key to dependable tire performance is the valve that *locks* the air in the tire.

Schrader supplies the kind of tire valves that do a positive air-sealing job and provide many extra qualities that result in added miles of greater safety, ease of steering and riding comfort.

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FIRST NAME IN TIRE VALVES

FOR ORIGINAL EQUIPMENT AND REPLACEMENT

NEW

SHELL INDUSTRIAL

bring greater under extreme

FOR GEARS...

SHELL MACOMA OILS

FOR ENCLOSED GEARS, Shell Macoma Oils solve the problem of extreme pressure lubrication with *seven distinct advantages:*

1. Extreme load carrying capacity . . . remarkable ability to prevent wear and seizure . . . even after long periods under heavy load.

2. Long-lasting oxidation stability . . . plus freedom from sludge formation in the presence of water.

3. Outstanding adhesion . . . maximum protection against rust, and against leakage through worn bearings and seals.

4. Non-corrosive . . . will not cause corrosion of steel or alloy bearings.

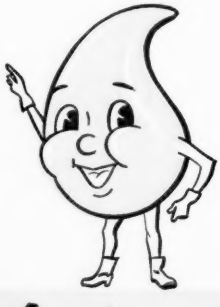
5. Non-Foaming . . . Shell Macoma Oils successfully overcome the tendency to foam caused by aeration of oil in the gear chamber.

6. Speedy water separation.

7. Complete stability in storage and in service . . . no tendency to separate, even in extremes of heat and cold.

SHELL

Be sure to get all the facts about these new Shell Macoma Oils. Check the coupon and attach to your letterhead for full information.



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EP LUBRICANTS

safety to gears and bearings
loads and adverse conditions

FOR BEARINGS...

SHELL ALVANIA EP GREASE

FOR GREASE-LUBRICATED bearings, Shell Alvania Grease . . . the one grease that serves *all* grease applications in the majority of plants . . . *now is available with EP qualities added!* . . . *now even more Multi-Purpose.*

All of these unique advantages of Alvania Grease are therefore available for the first time to operators of machines subject to extreme bearing pressures:

1. Higher mechanical stability than any conventional grease at operating temperatures.

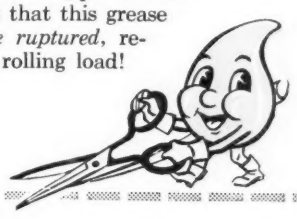
2. Pumpable at low temperatures . . . even through centralized lubrication systems.

3. Stable at high temperatures . . . no phase changes—still a grease at high temperatures—still a grease upon cooling.

4. Resistant to water . . . won't wash out.

5. Longer service life . . . reduced consumption.

Shell Alvania EP Grease is the answer to some of the toughest lubricating problems in industry. In rolling operations, for example, operators of steel, rubber, plastic and paper mills report that this grease film *just won't be ruptured*, regardless of shock rolling load!



Check the coupon and mail today for additional information about Shell Alvania EP Grease.

Shell Oil Company
50 West 50th Street, New York 20, N. Y.;
or 100 Bush Street, San Francisco 6, Cal.

Please send available data on

☐ Shell Macoma Oils ☐ Shell Alvania EP Grease

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SHELL OIL COMPANY

PROTECT
your vinyl plastics AGAINST BOTH LIGHT AND HEAT ...with these "Dutch Boy" Stabilizers

1. "DUTCH BOY" DYPHOS

Dibasic Lead Phosphite. The outstanding heat and light stabilizer for vinyl chloride polymers and copolymers. Dyphos is unexcelled in providing protection against the deleterious effects of *both* heat and light. Gives a useful life at least twice that of similar compounds using other stabilizers.

The remarkable effectiveness of Dyphos makes it possible to utilize chloroparaffins as low cost flame-resistant secondary plasticizers in quality products. Dyphos is also highly effective in plastisols and organosols.

2. "DUTCH BOY" TRIBASE *Tribasic Lead Sulphate plus* **"DUTCH BOY" DS-207** *Dibasic Lead Stearate*

The popular combination for good, all-around performance. Combines heat stability, light fastness and lubricity in processing.

3. "DUTCH BOY" DYTHAL

Dibasic Lead Phthalate. An excellent absorber of ultra-violet light, Dythal promotes light fastness in organic films. This advantage, combined with rugged heat stability derived from the basic character of this compound, makes Dythal the *general purpose stabilizer.*

"Dutch Boy" Stabilizers

PRODUCT	USE
TRIBASE (Tribasic Lead Sulphate)	Electrical and other compounds requiring high heat-stability
TRIBASE E (Basic Lead Silicate Sulphate Complex)	Low volume cost insulation
DS-207 (Dibasic Lead Stearate)	Stabilizer-lubricant for sheeting, film, extrusion and molded compounds
PLUMB-O-SIL A (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored sheeting and upholstery stocks
PLUMB-O-SIL B (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored film, sheeting, belting
PLUMB-O-SIL C (Co-precipitate of Lead Orthosilicate and Silica Gel)	Highly translucent film and sheeting
DYTHAL (Di-basic Lead Phthalate)	General purpose stabilizer for heat and light. Good electrical properties
DYPHOS (Di-basic Lead Phosphite)	Outstanding for heat and light in all opaque stocks, including plastisols and organosols
NORMASAL (Normal Lead Salicylate)	As stabilizer or co-stabilizer in vinyl flooring and other compounds requiring good light-stability

Accelerated tests in the laboratory, plus actual use tests, show that Dyphos, Dythal, and Tribase — DS-207 increase, tremendously, the useful life of plastic compounds.

For example, a compound containing Dyphos withstood over 2000 hours in the Weatherometer before failure.

"Dutch Boy" Stabilizers are a product of National Lead Company.

Our technical staff will help you stabilize vinyl resins for any use. Write for complete information.

Dutch Boy* **CHEMICALS**

*Reg. U. S. Pat. Off.

NATIONAL LEAD COMPANY

111 Broadway, New York 6, N. Y.

Reinforcing Plasticizers for FAST MIXING — EXTENDING — LOW COST —

RESINEX:

A low-cost, dark-colored polymerized aromatic resin in flake, solid or liquid form that improves properties of cured compounds . . . it gives better pigment dispersion with smoother stocks . . . It will improve resistance to flex-cracking and give better tensile with improved elongation.

AROMATIC PLASTICIZER 25:

An aromatic resin, light in color, having a melting point of 25°C. Ball & Ring . . . Has same general reinforcing properties in synthetic rubber compounds as the more commonly used coumarone indenes . . . A valuable extender or replacement for other types of less available reinforcing, plasticizing resins . . . It incorporates rapidly and exhibits excellent plasticizing action.

PICCOCIZER-R

High-boiling polymerized aromatic resin in liquid form that provides excellent properties in all types of synthetic rubber compounds . . . It is light in color and can be used readily in light-colored stocks since it has no staining characteristics. It promotes rapid incorporation assuring reduced mixing time and improved processing . . .

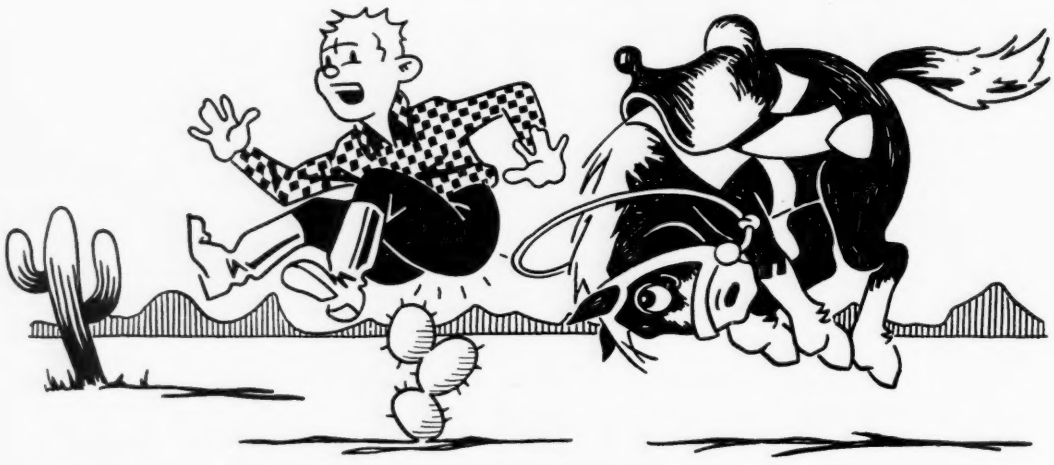
Write for bulletins on these aromatic plasticizers. They will give you complete technical information.

HARWICK STANDARD CHEMICAL CO.

AKRON, OHIO

BRANCHES: BOSTON, TRENTON, CHICAGO, LOS ANGELES

You can expect it to stick



There's no guesswork to TY-PLY

when properly applied. You can expect your rubber-to-metal adhesions to stick and stay stuck.

TY-PLY Q for bonding Natural, GR-S and Butyl
TY-PLY S for bonding Neoprene
TY-PLY BN for bonding N-types

"Stood the test of time . . . . since '39"

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94 Center Street North
Seville, Ohio
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M. E. Jones
1926 West 10th Avenue
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Harwick Standard Chemical Co.
1248 Wholesale Street
Los Angeles 21, California
(West Coast)

Dillons Chemical Company, Ltd.
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137 Wellington Street
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Anchor Chemical Company, Ltd.
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MARBON CORP.
GARY INDIANA

YOU GET A DOUBLE BONUS

. . . with pellet rubber

ADVANTAGES OF PELLET RUBBER SYSTEM

1. Uniformity and quality of finished product improved.
2. Extra working in pelletizer increases plasticity and gives better dispersion.
3. Banbury mixing cycle reduced—production increased.
4. Automatic conveying, weighing and mixing cuts handling and storage costs.
5. Less floor space required—floor storage and trucking eliminated.
6. Cleaner mill room—dust eliminated because pellet handling system completely sealed in.
7. Pellets thoroughly and quickly cooled—shorter time between processing operations—less stock in process.

* The Hale pelletizer is an extruding machine in which the screw forces the rubber up to the pelletizer head where the pellets are formed. The pellets are lightly coated, before leaving the machine, with a soapstone solution which prevents their sticking together.

Designed to transform bulky, hard-to-handle rubber into small, free-flowing pellets, the Hale pelletizer provides, in addition, a double bonus.

Exhaustive laboratory tests, confirmed by the experience of users, show that the extra working which the stock receives in passing through the pelletizer *improves the plasticity* and gives *better dispersion* of the various ingredients.

If you are interested in improving uniformity and quality of your finished product, while, at the same time, cutting your handling costs, send for complete information about the Hale pelletizer and the pellet rubber system. Write today—no obligation. FB-436

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants. Ansonia and Derby, Conn., Buffalo, N. Y. • *Sales Offices:* Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

Farrel-Birmingham

Now serving your needs as

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

You've known these familiar trademarks...

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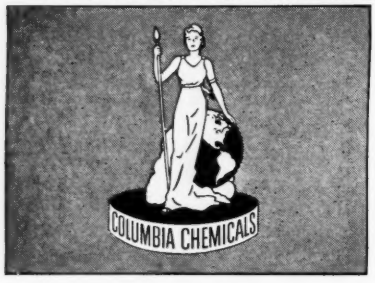
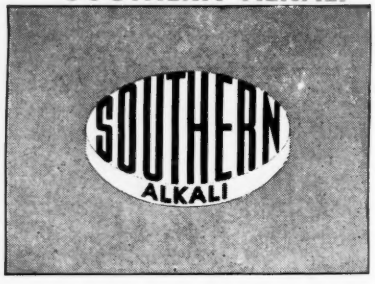


SOUTHERN ALKALI



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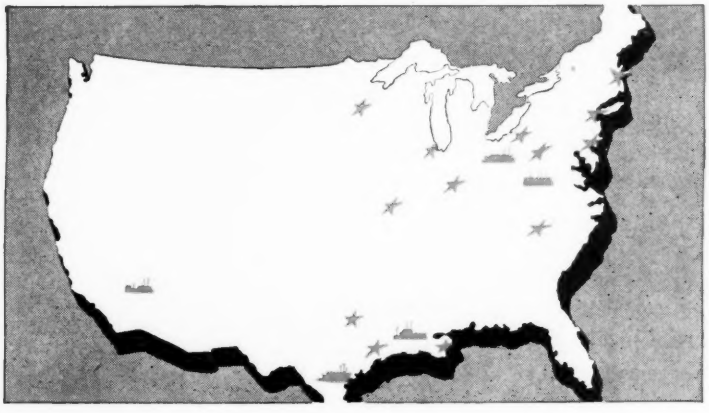
Whether you've been accustomed to doing business in the past with Columbia Chemical Division of Pittsburgh Plate Glass Company, or with Southern Alkali Corporation, you'll continue to find the same competent personnel—in every department—welcoming the opportunity to serve you as Columbia-Southern . . .

THROUGH STRATEGICALLY LOCATED PLANTS AND OFFICES



Production at all plants is being maintained at the highest possible levels in order to help meet the current requirements of industry.

And the same district offices will continue to provide facilities that assure the most careful attention to the needs of your business.

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Subsidiary of Pittsburgh Plate Glass Company

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...Perhaps Flintkote Research and Development have found the answer to your special needs, too!

Sometimes, in adhesives, coatings or sealers, *just a little difference makes all the difference in the world.*

And, finding that important difference may give you exactly what you are looking for in fabricating, compounding or processing. We have done just that for many manufacturers.

But first of all, investigate Flintkote's wide line of both aqueous and solvent types of compounds: cements, sizings, laminates, saturates, coatings and sealers. We may well have the product you need.

If not, if your requirements *do* turn out to be extra special—our trained research staff will welcome the opportunity to work with you—whether you want drum or carload quantities . . . rubber and resin formulations. Simply *write:*

THE FLINTKOTE COMPANY, *Industrial Products Division*
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30th Street, Long Branch, Toronto, Canada

FLINTKOTE *Products for Industry*

FLINTKOTE RESEARCH LABORATORY

QUALITY
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PRODUCTS

The Best in Pigments—FIRST

Constant interchange of scientific findings between all of the 26 separate Glidden laboratories helps to keep Glidden pigments outstanding. Important new developments by Glidden in many related fields, which can contribute to improved pigments, are immediately available to the three laboratories of The Chemical and Pigment Company Division. Thus in Glidden, you are assured of a source which has the knowledge to produce the best and most advanced pigments—*first.*

THE GLIDDEN FAMILY OF QUALITY PIGMENTS

CADMOLITH* COLORS

... each one a leader in its field!

Government Order NPA-M 19 restricts the use of pigments made from cadmium metal in the present emergency. Cadmolith Reds and Yellows, which offer a combination of advantages found in no other red and yellow pigments, are in limited production at this time. Samples gladly furnished on request.

SUNOLITH* LITHOPONE

A superior pigment for flat wall paints, undercoaters, water base paints, rubber and many allied products.

ZOPAQUE* TITANIUM DIOXIDE

A pure titanium dioxide offering excellent color and hiding power plus unexcelled working properties.

*Trade Mark Registered.

THE GLIDDEN COMPANY • Chemical and Pigment Company Division

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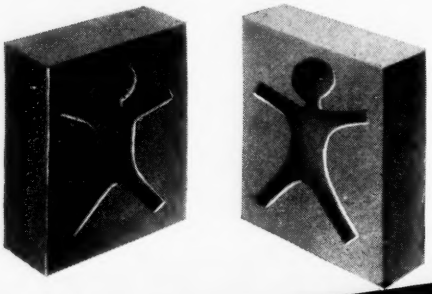
Relief

FROM A HOST OF "HEADACHES" IN RUBBER MOLDING—



with this improved G-E SILICONE MOLD RELEASE AGENT

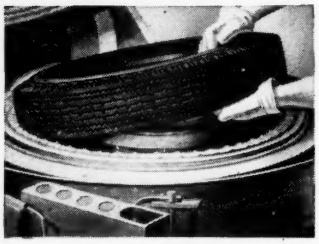
Production records in rubber companies, large or small, tell the remarkable story of General Electric's silicone mold release agent SM-61*. You get fewer rejects . . . reduced mold down time for cleaning . . . more *even* release . . . better products faster . . . as compared with conventional mold release agents! SM-61 is today's leading mold release agent, and here are the reasons why . . . these *proved* advantages with SM-61 . . .

- **Excellent Mold Coverage**—SM-61 gives outstanding performance on intricate molds.
- **Stability at Higher Temperatures**—SM-61 remains stable at temperatures up to 150 F.
- **Stability under Mechanical Working**—SM-61 won't break or cream under *repeated* recycling in centrifugal pumping systems.
- **Hard Water Stability**—SM-61 remains stable 24 hours at ½% dilution in water of over 200 P.P.M. hardness.
- **Many Other Advantages**—SM-61 will not stain light-colored stocks, is rust-inhibited, has low toxicity, and gives outstanding performance in numerous other ways.

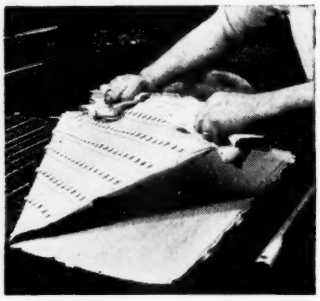
These advantages are all *on the record* of large rubber plants and test laboratories. Why not try SM-61 for yourself? *Chemical Division, General Electric Company, Pittsfield, Massachusetts.*

For details, write to Section P-4, General Electric Company, Waterford, New York. (In Canada: Canadian General Electric Co., Ltd., Toronto.)

*Formerly G-E 81161



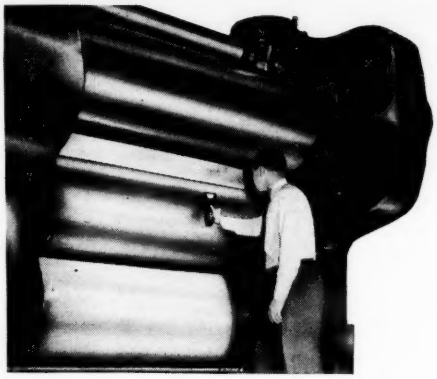
Tires are easily released untorn, unscratched—thanks to SM-61, which prevents pocketing.



Smoother finished rubber buttons are obtained through the even release provided by SM-61.

Silicones for the Rubber Industry

GENERAL ELECTRIC



STABILIZERS

There is no one stabilizer to meet all your needs. Whatever your requirements are, however, there is an ADVANCE stabilizer to satisfy them.

Stabilizing your production is as important as stabilizing your product.

ADVANCE VINYL RESIN STABILIZERS offer the consistently uniform, high-quality performance that keeps production moving as well as maximum light and heat resistance and flexibility, minimum effect on transparency.

ADVANCE stabilizers are products of years of technical research, development and practical application. Put this experience and technical skill to work at your problem, common or special. Write, phone or wire today from anywhere in the United States and Canada.

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SOLVENTS & CHEMICAL CORP.
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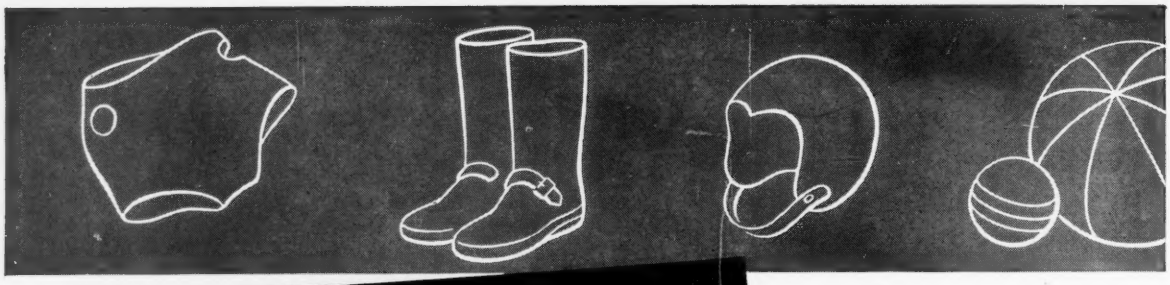
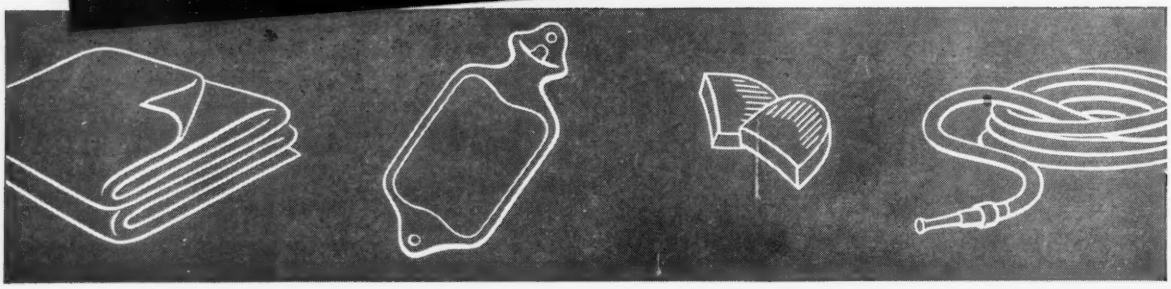
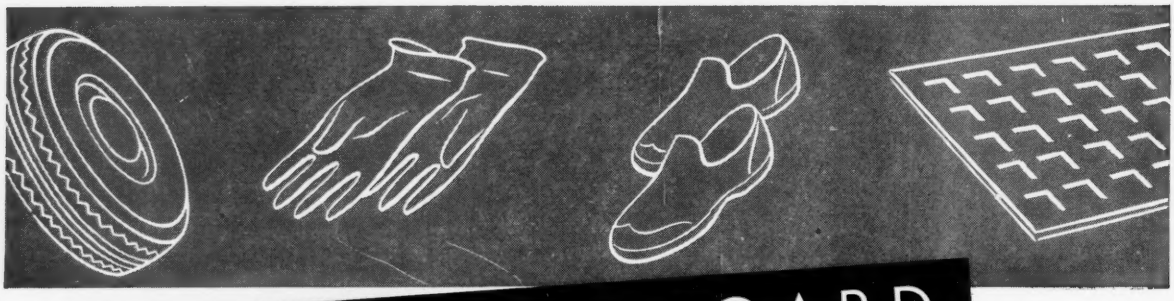


TITANOX means



whiter.... brighter rubber products



ACROSS THE BOARD

The pure titanium dioxide pigments, TITANOX-A and TITANOX-RA assure whiter whites and brighter color tints with minimum loadings, thus maintaining the desirable characteristics of your product. TITANOX-RA-NC is advantageous in compounds which are exposed to sunlight and the weather. TITANOX-RCHT (rutile-calcium pigment) is preferred for economical whiteness and brightness in more heavily loaded stocks. Its finely divided pigment and extender promote normal aging and resist discoloration.

Our Technical Service Department is ready at any time to discuss your individual rubber pigmentation problems with you. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments, Ltd., Montreal 2; Toronto 1.

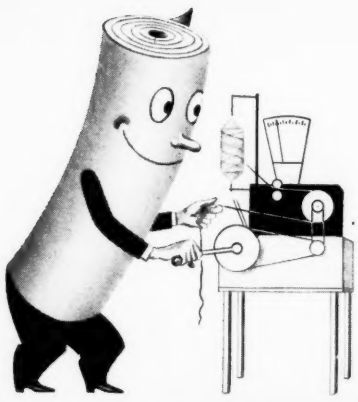
8970

® TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY



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Makes the Big Difference in INDUSTRIAL Fabrics

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Give You Greater Fabric Uniformity

The greater uniformity of Mt. Vernon fabrics means *consistent* quality in your finished products — smoother, more efficient fabrication.

AT YOUR SERVICE

Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or opplication of industrial fabrics.

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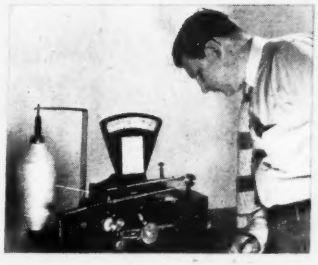


CHECKING COEFFICIENT OF VARIATION And Average Factor Of Quality On Evenness In Roving With Belger Tester. One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.

ACTIVATOR NEWS

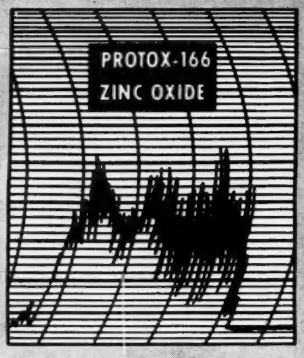
HORSE HEAD PRODUCTS

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

Plasticizing Action of PROTOX ZINC OXIDE *SPEEDS PROCESSING of* BUNA-N

POWER CONSUMPTION CHARTS OF BUNA-N MASTERBATCHES

Conventional zinc oxide resists wetting by Buna-N and other high-Mooney polymers.



Protox-166 definitely plasticizes Buna-N and provides easier-processing stocks.

The plasticizing properties of Protox-166* are most pronounced in Buna-N, one of the most difficult rubbers to process.

In zinc oxide masterbatches with Buna-N, Protox-166 eliminates the customary initial power surges (see charts) and provides a softer, easier-working stock.

This plasticizing effect does not hinder pigment dispersion. As indicated in the sections below, Protox-166 disperses more completely than conventional zinc oxide. That is because the zinc propionate coating on Protox serves not only as plasticizer but also as a dispersing agent.

*U.S. Patents, 2,303,329 and 2,303,330

ZINC OXIDE DISPERSIONS IN BUNA-N MASTERBATCHES

Zinc Oxide-A—Untreated zinc oxide disperses quite effectively in Buna-N, but still shows some aggregated pigment in this short mixing cycle.

Protox-166—This pigment disperses in Buna-N more completely than any other oxide, because of its zinc propionate coating.

THE NEW JERSEY ZINC COMPANY

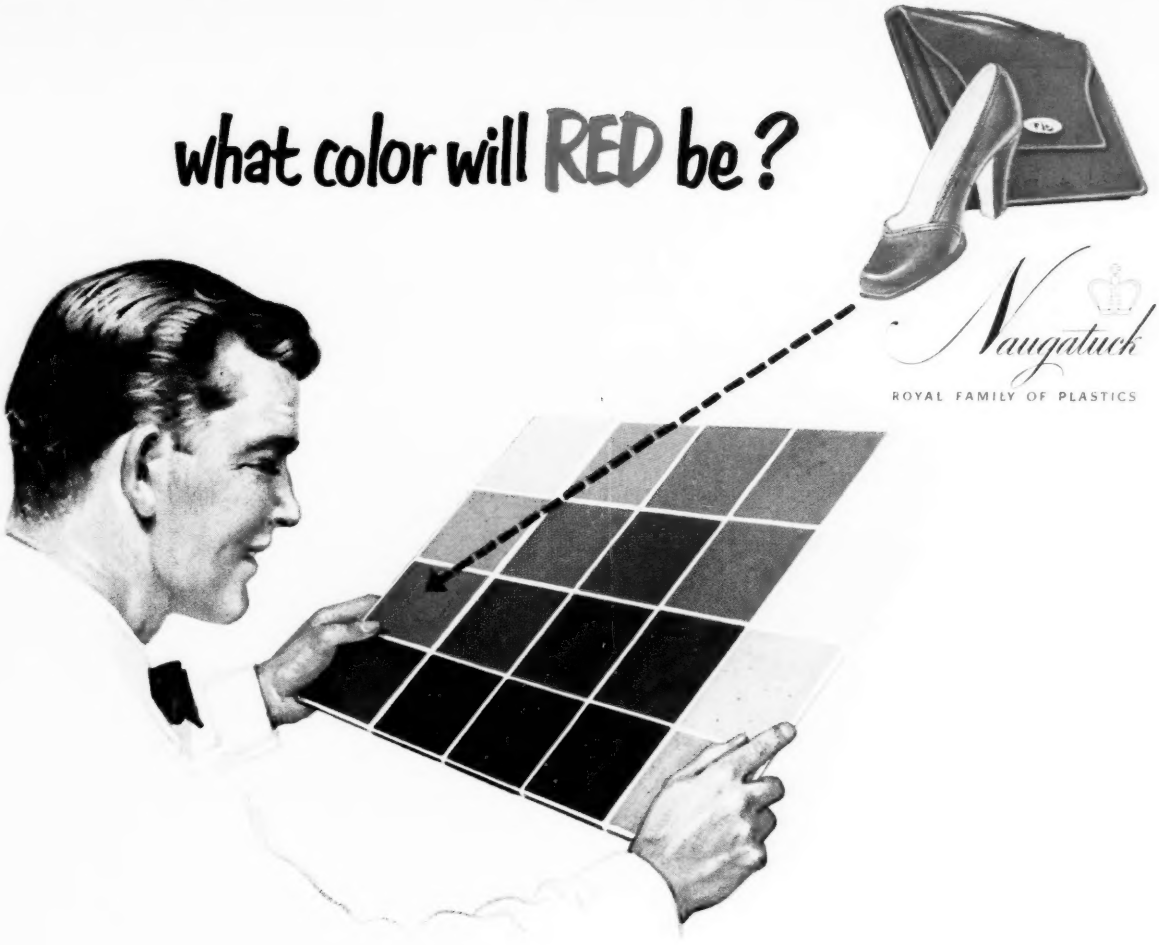
Producers of Horse Head Zinc Pigments

. . . most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

what color will RED be?



Naugatuck

ROYAL FAMILY OF PLASTICS

How Naugatuck Marvinol Laboratories can help you with color problems in VINYLS

In compounding or processing do you maintain your vinyl colors just as you want them? Do color-matched products really match? Do they remain true as long as the product lives?

These are tough problems. But the Naugatuck Chemical Laboratories may have answers to help you solve many of them.

Thousands of man-hours and dollars are devoted each year to fundamental color technology. The results of this unusual storehouse of color "know-how" are here for application to your problems.

Hundreds of charts record the effect of stabilizers and lubricants on the heat and light stability of the important colorants in vinyl compounds. Competent color technologists are ready to advise and help you.

Our Naugatuck laboratory is *your* laboratory with vast amounts of data on colorants, stabilizers, plasticizers, and plastic processing techniques. And our Naugatuck Marvinol resins have the *stability* your products need.

Yes, Naugatuck is a sound base for your plastics future—with the right combination of laboratory "know-how" plus the best resins or resin combinations for your future. Why not see how much our scientific service and our Marvinol resins can do for your products? Write us today on your company letterhead. Send inquiry to the address below.

Naugatuck Chemical Division of UNITED STATES RUBBER COMPANY

209 ELM ST., NAUGATUCK, CONNECTICUT

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • New York • Philadelphia • IN CANADA: Naugatuck Chemicals, Elmira, Ontario

MARVINOL® vinyl resins • KRALASTIC® styrene copolymers • VIBRIN® polyester resins

Rubber Chemicals
Aromatics
Synthetic Rubber
Agricultural Chemicals
Reclaimed Rubber
Latices

PHOTOGRAPH: UNITED AIR LINES

"Up in the Air" About Solvents?

Skellysolve for Rubber and Related Industries

Applications

SKELLYSOLVE B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound.

SKELLYSOLVE C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve B.

SKELLYSOLVE D. For cements and variety of manufacturing operations. Good odor. Quick drying. Minimum of heavy, greasy compounds.

SKELLYSOLVE H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve D is desired.

SKELLYSOLVE E. For use wherever a relatively slow drying solvent is desired.

SKELLYSOLVE R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency.

"DOC" MacGEE SAYS: You benefit in many ways when your solvent problems are dissolved with Skellysolve! Strict laboratory controls mean that every batch of Skellysolve is the same. You get *uniformity* that protects your product's quality and helps your salesmen to get new business as well as to hold old customers.

No bloated containers because of high vapor pressure—no blisters in tires or shoes due to blushing or high boiling compounds. No seeds in cements due to low boiling compounds. And high bonding strength because of freedom from greasy residues.

From various standpoints, you're better off with Skellysolve. It is less toxic than some other solvents, therefore reduces health hazards. It is sweet-smelling, pleasant to work with—and it won't freeze at atmospheric temperature.

Check Skellysolve from every angle—low end points, quick evaporation, low vapor pressure, minimum of unsaturates and pyrogenic decomposition products — just the characteristics you look for.

Get complete technical facts. Write today for full information on Skellysolve!

SKELLY

Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY
KANSAS CITY, MISSOURI

When it's PELLETEX you KNOW...

Belts give Lasting Service

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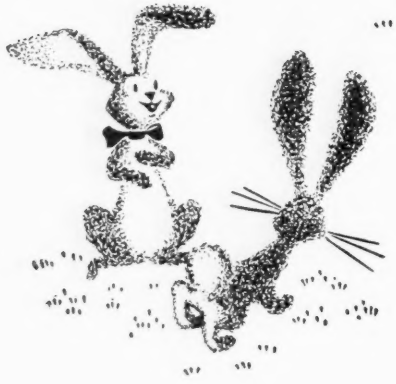

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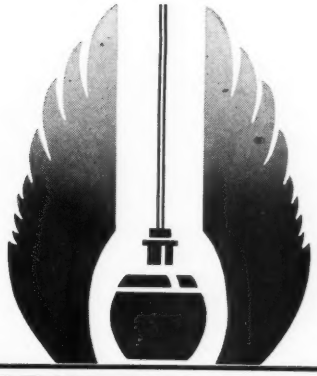

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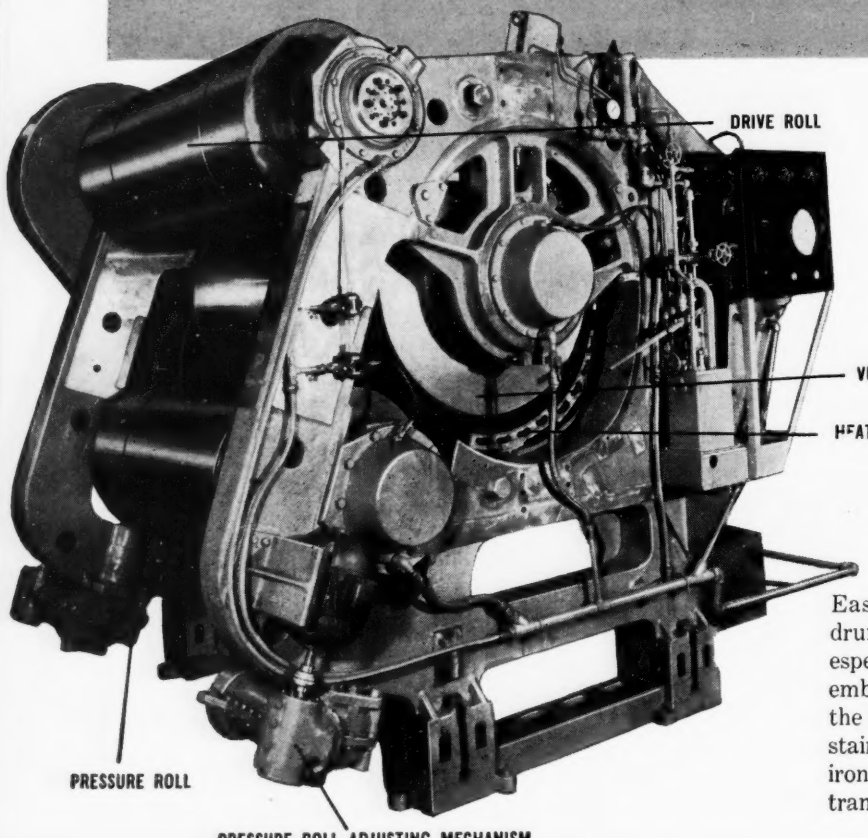

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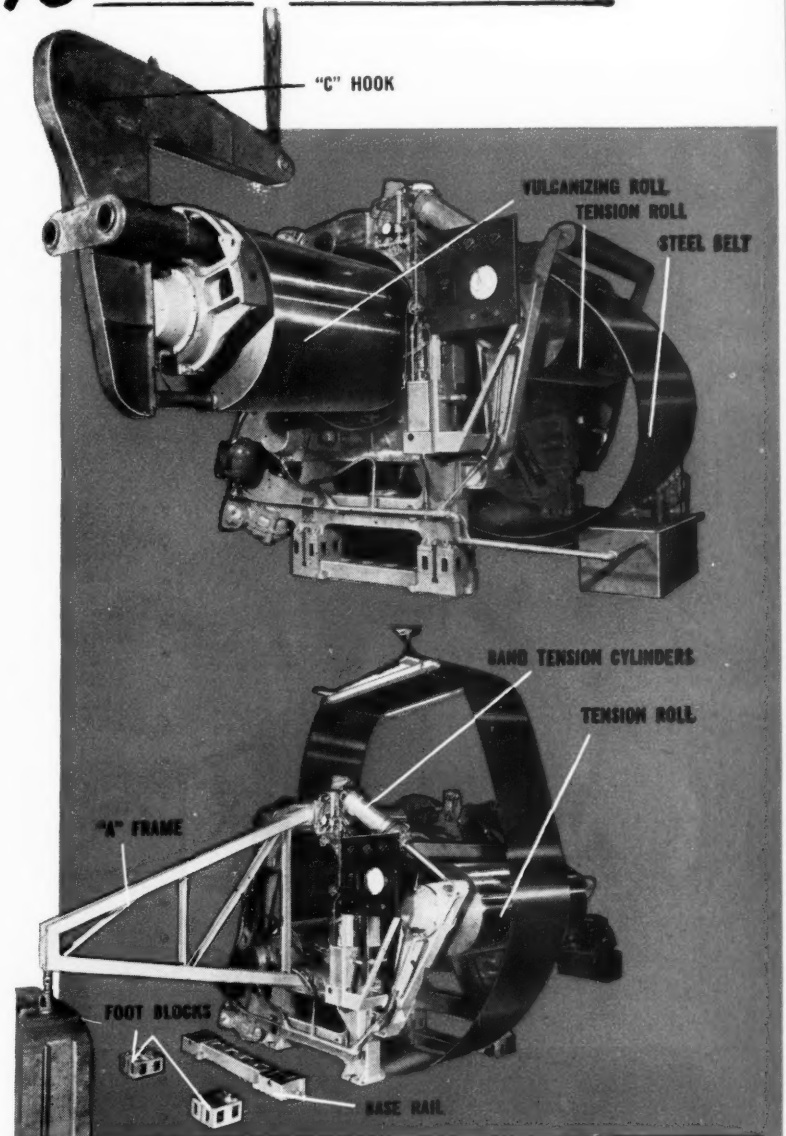

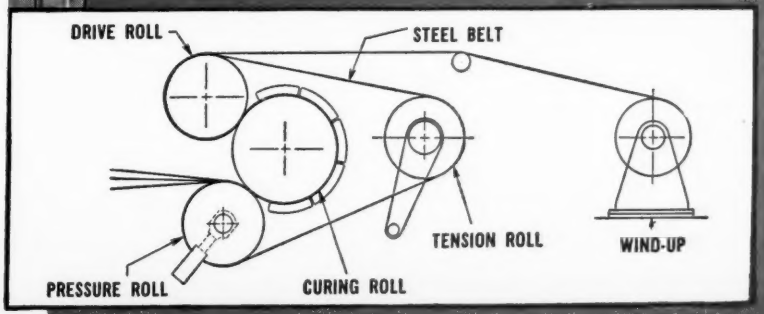

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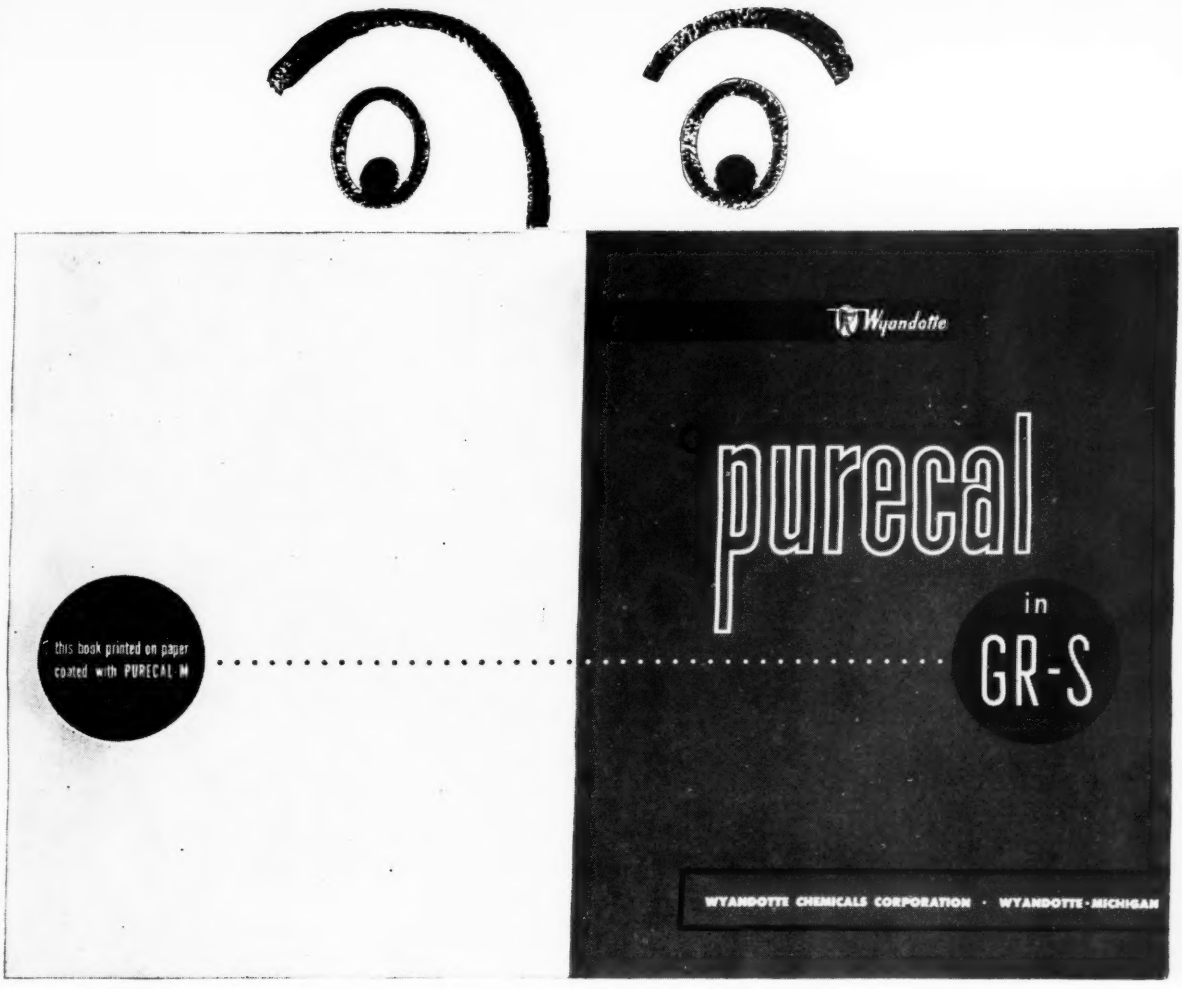

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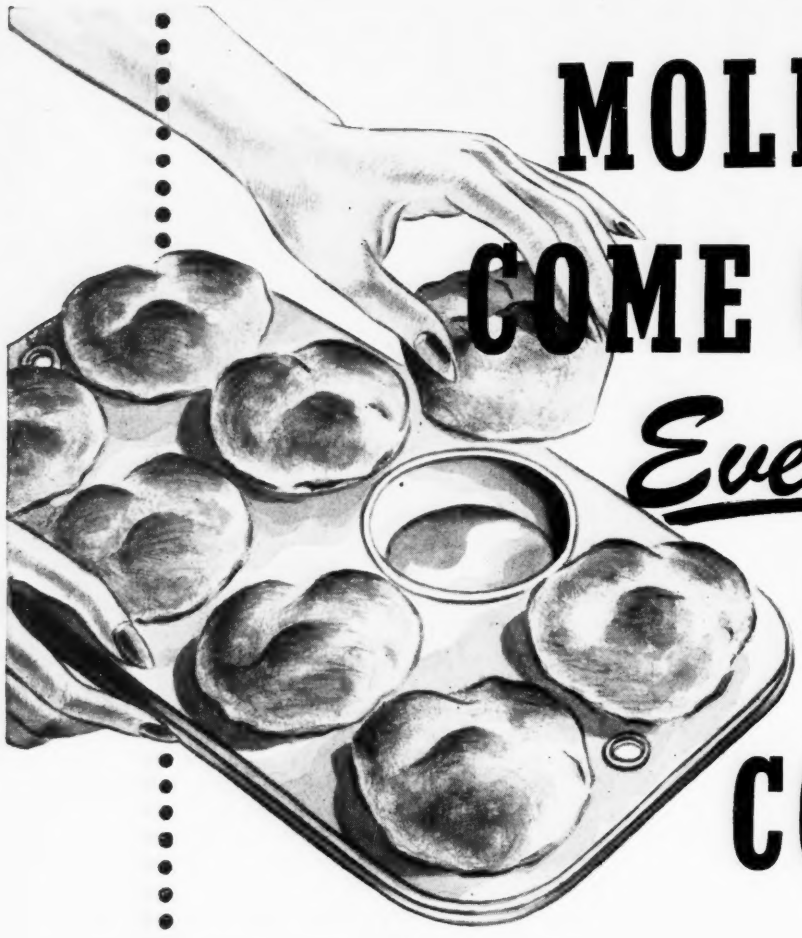

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VOL. 124 — NO. 6 SEPTEMBER, 1951

Electrostatic Potential "Bleed-off" in Rubber Compounds

J. A. Hurry[1], T. D. Bolt[1], W. E. French[1]

THE measurement of electrical conductivity alone is not an adequate criterion of the ability of a rubber product to dissipate an electrostatic charge. It is true that the rubber product must be sufficiently conductive to prevent the accumulation of charges at any time during its life, but the degree of conductivity necessary is difficult to correlate with static dissipation. The single purpose of imparting conductivity to a rubber compound is to prevent the accumulation of electrostatic charges which can result in a spark discharge. A static spark discharge in the vicinity of flammable material may be a hazard by causing fire or explosion.[2] The spark discharge can also cause car radio interference when it occurs with tires[3] or belts. The primary problem in the application of conductive rubber is not the attainment of a degree of conductivity in the compound, but rather it is the ability of the rubber product to dissipate static charges *under all service conditions.*

Electrical Conduction in Rubber Compounds

Electrical conductivity has been the primary basis in the design of rubber compounds for static-free applications. Habgood and Waring[4] and Bulgin[5] give excellent histories of the development of conductive rubber. Electrical conductivity in rubber compounds has been explained on the basis of the formation of paths of carbon black in the rubber matrix through which the electrical current can be carried. It is commonly assumed that the black particles form a closely knit chain-structure within the rubber mass. The blacks considered "conductive" are those having the physical characteristics that tend to form and retain a chain structure. The degree of dispersion of the black and the mixing, processing, and service conditions to which the compound is subjected may cause large differences in the conductivity of a single formulation. Briefly, if those conditions are such that they tend to break the carbon chain and separate the carbon particles, then the conductivity will be decreased. Conversely, those conditions which enhance the carbon black flocculation or tend to prevent the carbon particles from separating serve to improve the conductivity.

The problem in the application of conductive rubber is one of using a compound which will prevent the accumulation of static charges, regardless of the degree of conductivity, rather than designing a formulation which will possess an arbitrary degree of conductivity. If the static charges are dissipated as rapidly as they are generated, the static potential can be maintained at zero, and no spark discharge will occur. The general problem may be summarized as follows:

"What physical measurements or criteria will insure that a rubber compound is able to maintain the static potential of a rubber product at zero during the entire life of the product?"

Resistivity Test as a Criterion of Adequacy

If it were possible to correlate conductivity or resistivity of a rubber product with the dissipation of static charges, a resistivity test could be used as a criterion of adequacy. The resistivity test, however, would be an indirect, rather than a direct, measurement. The resistivity of a compound is usually measured on a sample which has been handled with considerable care. Extreme precautions are taken to prevent the distortion of the sample between curing and testing. In the ASTM resistivity test (D 991-48T) the apparatus provides arbitrary pressures for the current and potential electrodes and a direct current in which either the voltage or current is

[1] The Gates Rubber Co., Denver, Colo.
[2] NSC, Safe Practices Pamphlet No. 52, "Static Electricity." National Safety Council, Chicago, Ill.
[3] S. M. Cadwell, N. E. Handel, G. L. Benson, *Ind. Eng. Chem.*, 19, 1141 (1941).
[4] *Rubber Chem. Tech.*, 15, 146 (1942).
[5] *Ibid.*, 19, 667 (1946).

specified. It can be shown that the measured resistivity will vary widely as a result of seemingly minor differences in sample preparation and history.

The use of a resistivity test alone as a measure of static dissipation is obviously unrealistic. It is known that the conductivity of a rubber compound can easily be changed, depending upon the conditions to which it is subjected. Yet it is the common practice to determine the resistivity of a compound that has been treated in a critical and exacting way. This measurement is, then, erroneously considered to represent the conductive properties of the rubber throughout its service life, disregarding changes resulting from conditions of application.

When dissipation of static charges occurs in product service, the voltage, type of current, and magnitude of current density will undoubtedly be entirely different from those used in the resistivity test. A resistivity test, therefore, must not be considered a final criterion of static dissipating ability because of the lack of similarity between laboratory test conditions and actual product application.

Potential "Bleed-off" as a Criterion of Adequacy

In a more direct approach, conductive rubber can be subjected to a static potential generated in the laboratory. If the compound will "bleed-off" (dissipate) the potential, then it is performing exactly the same function as it would be called upon to do in the product. If the potential "bleed-off" is adequate, no accumulation of static charges can occur in the product. The static charge can be generated so as to simulate the conditions which may be encountered in product service. The measurement is very simple; the compound either will or will not "bleed" the potential under all conditions. An electrostatic potential "bleed-off" test should therefore be a more reliable standard of acceptance for the rubber compound in the product.

The Static Machine

TABLE I. VALUES OF ARC—OVER-POTENTIAL VERSUS SPARK GAP DISTANCE*

Gap Distance		Arc-Over Potential in Kilovolts				
		Two-Points	Sphere Diameter—Electrostatic Generator			
Cm.	In.	Spark Coil	1 Cm.	2 Cm.	5 Cm.	10 Cm.
1	0.394	12	25	27	28	29
2	0.787	23	37	47	52	53
3	1.181	33	45	62	86	89
4	1.575	42	50	71	94	102
5	1.969	50	54	78	108	123
6	2.362	56	58	82	118	140
7	2.756	62	62	86	127	155
8	3.150	67†	67	88	134	168
9	3.543	71†	71	91	141	180
10	3.937	75†	75	92	147	190
11	4.331	79†	79	93	152	198
12	4.724	84†	84	95	156	206
13	5.118	88†	88	97	160	214
14	5.512	93†	93	100	164	222
15	5.906	98†	98	104	167	228

Values of air at 77° F. (25° C.) and 760 mm. of Hg.

Pressure and temperature correction may be applied to the arc-over potential values by means of the relationship:

$$V_c = V_t \frac{0.392\ P}{273 \pm T}$$

Where:
V_c = Corrected potential, KV.
V_t = Potential at standard temperature and pressure, KV (from Table 1).
P = Barometric pressure, mm. of Hg.
T = Temperature, °C.

* Dr. Mario Iona, University of Denver, unpublished data.
† Approximate.

An electrostatic charge can be generated in a static machine of the type illustrated in Figure 1. The charge can be accumulated until sufficient static potential exists to cause a spark to jump across the airgap between discharge balls. The static voltage generated by the machine is governed by the gap between the discharge balls; the wider the gap the higher the voltage (Table 1). In this test a rubber sample is laid across, or attached to, the discharge balls as shown in Figure 1. This set-up provides parallel paths for the dissipation of the static charge of the generator. Depending upon the relative resistance of the rubber and the airgap, the charge will either be continuously dissipated through the rubber or produce a spark discharge through the air.

The concept of potential "bleed-off" is somewhat analagous to a situation in hydrodynamics. If a vessel is being filled with water at a rate of input I, and is being emptied through an orifice at a rate of discharge, D, the head of water, H, will be dependent on the rates, I and D. When I is greater than D, H will increase. When H exceeds the depth of the vessel, water will overflow. If I is less than D, H must be zero. Correspondingly, if the rate of dissipation of static charges is greater than the rate of accumulation, no static potential will exist. If the static charges are accumulated more rapidly than they are dissipated, the potential may increase to a value at which a spark discharge will occur.

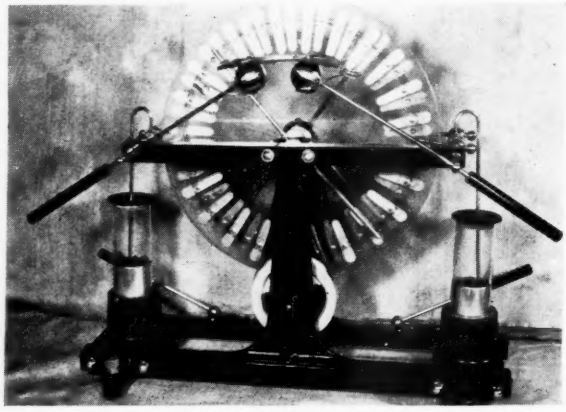


Fig. 1. A Wimshurst-Type Static Generator with Sample Mounted for Static "Bleed-Off" Test

If a non-conductive (insulating) compound is tested, a spark discharge will occur at both the narrow and the wide separations of the discharge balls. A compound that is marginal in conductivity (semi-conducting) will allow a spark discharge only when the balls are close together. A conductive compound will not allow a spark discharge regardless of the setting of the balls.

The Induction Coil

A static generator is not always readily available to all laboratories. Also, the maximum static potential generated by such a machine is dependent upon the atmospheric conditions existing at the time of the test. For these reasons the induction coil may be used as an alternate method determining the potential "bleed-off" without the vagaries associated with the static machine. An induction coil is illustrated in Figures 2 and 3. A sample holder may be seen in the foreground of Figure 2 and in testing position in Figure 3. The sample holder was prepared from Plexiglas with a circular hole in the center. Heavy copper wires extend from the posts of the induction coil at A,A' to the edge of the center hole at B,B'. The distance between the points C,C' may be adjusted so that the path of the spark discharge will occur indiscriminately between B,B' or C,C', as in Figure 3. The test specimen may then be placed across the sample holder in firm contact with B,B'. Only a fully conduct-

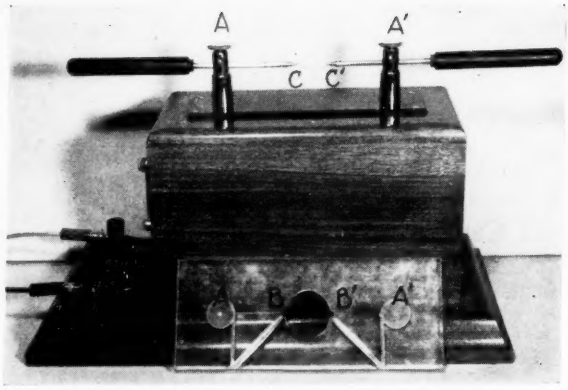


Fig. 2. Induction Coil with Sample Holder Unmounted

ing compound will prevent a spark discharge from B to B' or C to C'. The rubber samples may then be tested in precisely the same manner as with the static machine.

Potential "Bleed-off" of Compounds with Various Carbon Blacks

To show the application of the method, a series of compounds with various types and amounts of carbon black was prepared and tested. The following base formula was used:

Ingredients	phr
Rubber	100
Zinc oxide	3
Stearic acid	2
Antioxident	1
Sulfur	2.5
Process oil	5–8
Accelerator	0.5—0.7

Blacks were added to this base mix, and the softener and the acceleration adjusted for practical processability and proper cure. Vulcanized rubber strips (0.5-inch by four inches by 0.075-inch) were clipped to the discharge balls of the static machine, as illustrated in Figure 1, and were tested for static "bleed-off" by the previously described procedure. The results of the test are shown in Table 2, along with ASTM resistivity values.

The gum stock (A) would not "bleed-off" the static potential and was therefore considered insulating. The static dissipation characteristics of types of blacks and the effect of their concentration are evident. It is especially interesting that all types of blacks make the compound completely conductive if used in sufficient amounts. Even the large-particle MT black, not normally considered a conducting black, "bled" the static machine at 150 phr loading. SRF and HMF blacks were completely conductive at 75 phr; MAF, HAF, and EPC blacks at 50 phr; and only 25 phr of acetylene black was required to produce complete static dissipation. Two of the compounds (D and J) with 1.0 (10^8) ohm-cm. resistivities were marginal in potential "bleed-off." With a resistivity of 2.0 (10^7) ohm-cm., compound Q was sufficiently conductive to "bleed" the static machine. All of the compounds having resistivities greater than 1.0 (10^8) ohm-cm. were insulating; while all compounds having resistivities equal to or less than 2.0 (10^7) ohm-cm. were conducting. Thus the ASTM resistivity test may be employed to segregate those compounds which will probably have adequate static dissipation. The final and most reliable criterion of compound acceptance, however, must be the ability to "bleed-off" a true static potential.

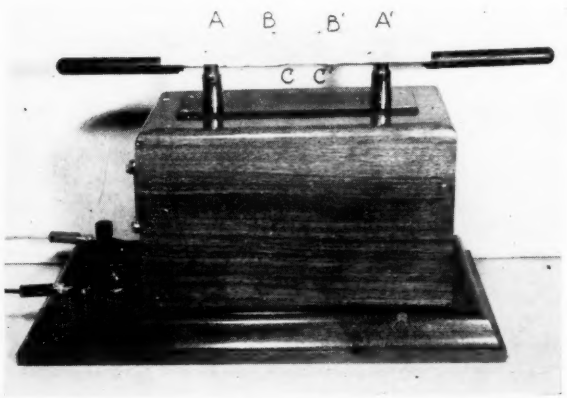


Fig. 3. Induction Coil with Sample Holder in Position for Test

TABLE 2. STATIC MACHINE "BLEED OFF" VALUES OF COMPOUNDS WITH VARIOUS TYPES AND LOADINGS OF CARBON BLACK

Diameter of discharge balls—2.54 cm., Gap distance—5.08 cm., Temperature—21.2° C., Barometric Pressure—630 mm. of Hg., Static Potential 76 KV.

Compound	phr Black,	Potential "Bleed-off"	ASTM Resistivity Ohm-Cm.
A	None	Insulating	$+10^8$
B	50 MT black	Insulating	$+10^8$
C	100 MT black	Insulating	$+10^8$
D	125 MT black	Semi-conducting	10^8
E	150 MT black	Conducting	2×10^6
F	50 SRF black	Insulating	$+10^8$
G	75 SRF black	Conducting	10^7
H	100 SRF black	Conducting	2×10^5
I	25 HMF black	Insulating	$+10^8$
J	50 HMF black	Semi-conducting	10^8
K	75 HMF black	Conducting	3×10^5
L	100 HMF black	Conducting	6×10^4
M	20 MAF black	Insulating	$+10$
N	30 MAF black	Insulating	$+10^8$
O	50 MAF black	Conducting	9×10^4
P	25 EPC black	Insulating	$+10^8$
Q	50 EPC black	Conducting	2×10^7
R	75 EPC black	Conducting	9×10^5
S	20 HAF black	Insulating	$+10^8$
T	30 HAF black	Insulating	$+10^8$
U	50 HAF black	Conducting	7×10^5
V	15 Acetylene black	Insulating	$+10^8$
W	20 Acetylene black	Semi-conducting	10^8
X	25 Acetylene black	Conducting	8×10^5
Y	30 Acetylene black	Conducting	1500
Z	50 Acetylene black	Conducting	37
AA	73 Acetylene black	Conducting	15

*Barometric pressure at Denver, Colo., elevation, 5,000 feet plus, is in the 620-640 mm. Hg. range.

A potential "bleed-off" test can serve as a valuable means of differentiating between compounds that are conductive and that are insulating. Thus it can be used to establish the transition range as the loading of various blacks is increased in different polymers. These transition ranges would be characteristic of the black and polymer combinations so that the effect of processing variations and other compounding ingredients could be also observed.

Comparison of Potential "Bleed-off" Tests

To confirm the potential "bleed-off" data as shown in Table 2, a number of additional tests were made consisting of the following:

A. Repeat mixes and tests of selected compounds, particularly those of marginal conductivity.

B. Use of a larger static machine than illustrated in Figure 1, having a greater electrostatic capacity and capable of greater current density during discharge. Test conditions were as follows: diameter of balls—2.16 cm.; gap distance—6.35 cm.; temperature 23.1° C.; barometric pressure—638 mm. of Hg.; static potential—76 KV.

C. Determination of "bleed-off" characteristics of all compounds when subjected to the induction coil as shown in Figure 2 to determine whether there was any difference in potential "bleed-off" between an imposed potential of the static-capacity type or an induced electromagnetic potential of the induction coil type. The conditions of the test follow: diameter of discharge balls—two points; gap distance—3.5 inches; temperature—23.9° C.; barometric pressure—638 mm. of Hg.; static poten-

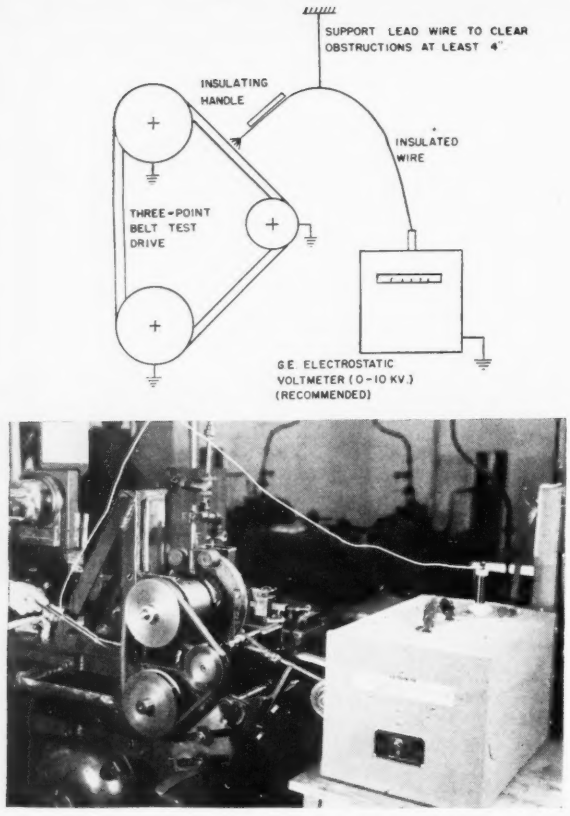

SUPPORT LEAD WIRE TO CLEAR OBSTRUCTIONS AT LEAST 4"
INSULATING HANDLE
INSULATED WIRE
THREE-POINT BELT TEST DRIVE
G.E. ELECTROSTATIC VOLTMETER (0-10 KV.) (RECOMMENDED)

Fig. 4. Apparatus for Static Voltmeter Measurement of Field Potential of a V-Belt

tial—59 KV.

D. Different methods and pressures of contact between rubber samples and discharge balls of the static machine.

E. The use of a lower frequency (60 cycle), higher potential induction coil than that illustrated in Figure 2.

Despite the widely different conditions employed in the tests, the ability of a compound to "bleed-off" the potential was clearly and readily defined. *Each of the tests segregated the compounds into exactly the same groups of insulating, semi-conducting, and conducting as shown in Table 2.*

Potential "Bleed-off" during the Life of the Product

The physical properties of a rubber product are normally expected to change during its useful life. Correspondingly, a change in the conductivity or potential "bleed-off" ability can be anticipated. A potential "bleed-off" measurement made at the beginning of service will not guarantee that a product will be "static-free" during its entire service life. If the product will pass a potential "bleed-off" test at any time during its service life, however, it will never be possible for that product to accumulate a static charge or allow a spark discharge.

The minimum black content of a compound to be used in a "static-free" product can be established by a potential "bleed-off" test if the test is made after subjecting the product to simulated service conditions. Each product and its service conditions have to be considered individually to determine the necessary black content.

In general, product applications are characterized by one of three types of service conditions:

Type A. Those products in which no change or only a negligible change occurs in the effective surface area or volume of the conductive rubber compounds, as a result of conditions encountered in service. Conductive rubber products of this type are static straps, conductive floor tiling and conductive shoe soles. Even conductive tires and sandblast hose would fall in this classification for although the rubber compound is partially abraded, the nature of the surface remains relatively unchanged.

Type B. Those in which the effective surface area or volume of the conductive rubber compound is reduced as a result of abrasion. A "static-free" belt is a good example of this type of product. Flexing and movement of the belt in the sheave will abrade rubber from the surface of the belt. If a fabric, impregnated with a conducting rubber compound, is used as an outer covering of the belt, abrasion will remove the rubber from the surface of the fabric. Since the effective surface area of the conducting rubber compound is significantly reduced, the ability of the belt to "bleed" a potential will have been correspondingly reduced.

Type C. Those in which the effective surface area and volume of the conducting rubber compound is changed as a result of swelling of the compound after exposure to solvents and oils. Applications of this type requiring conductive rubber compounds are gasoline hose nozzles and hose designed to carry solvents and oil.

In a product application of Type A the black content of the conductive compound will need to be no higher than that required to provide potential "bleed-off" of a plate sample. In the applications where the nature and the area of the surface of the conductive rubber compound are changed, the black content and hence the conductivity will need to be correspondingly increased.

Static Voltage Measurements *versus* Potential "Bleed-off"

In certain dynamic applications the static charge may be generated as the result of the motion of the product itself. The accumulation of such static charges can be measured at the surface of the product by means of an electrostatic voltmeter. If the product will pass a potential "bleed-off" test, there should be no accumulation of static charges, and the voltmeter should register zero. Thus the potential "bleed-off" criterion can be confirmed by the absence of a static voltage on the product during actual use. In Figure 4 the use of the electrostatic voltmeter to measure the field potential of a V-belt on a three-point drive is illustrated. It may be similarly employed to determine the degree (or absence) of a static charge generated in other dynamic applications.

Application of Potential "Bleed-off" Criterion

Power transmission V-belts, a Type B product application, were selected to evaluate the potential "bleed-off" criterion during product life. Two groups of belts were constructed, one group of ½-inch top-width section light-duty belts, and the other B-68 industrial belts. In each group the belts were of standard construction and materials except for the cover or outside wrapper. Four cover variations for each of the two types of belts were made by impregnating the fabric with natural rubber compounds containing 10, 25, 40, and 60 phr of acetylene black respectively. A standard compound which has been proven to be satisfactory in "static-free" applications was used as the control.

The group of five ½-inch top-width section belts was

placed on an accelerated dead-weight test, as illustrated in Figure 5. In order to prevent "bleed-off" to the ground, each of the sheaves was insulated from the shaft as shown in Figure 6. By insulating the sheave, the rate at which the belts can accumulate static charges is effectively increased. The test was conducted with a dead-weight load of 52 pounds on a 44-inch belt with 3.765-inch diameter sheaves at 3600 rpm. Static voltage was measured at intervals on the top and the side of the belts by the static voltmeter method shown in Figure 4. After each measurement of static voltage the belts were removed from the drive and resistance and potential "bleed-off" measured. The data for each of the group of ½-inch top-width section light-duty belts are given in Table 3. The formula and method of calculation for measured resistance of endless belts are given in Appendix A. None of the belts produces a static voltage when first placed on the test drive although the potential "bleed-off" test shows groups A, B and C become non-conducting (by the potential "bleed-off" test) and start to generate a static voltage after only five days of use. This change from a marginally conducting to a non-conducting state may be the result of:

1. An actual loss of the conductive rubber material due to abrasion of the belt cover.

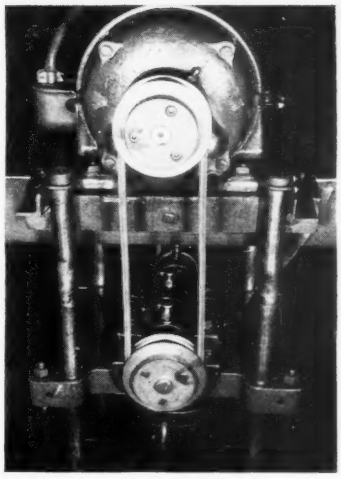
2. A decrease in the conductivity of the rubber composition due to a low or marginal black content.

TABLE 3. POTENTIAL "BLEED-OFF," STATIC VOLTAGE, AND RESISTANCE OF ½-INCH SECTION LIGHT-DUTY BELTS

Test Time, Days	Resistance, per Unit Length, Ohms/In.	Potential "Bleed-Off"	Static Voltage, KV	
			Top	Sides
		Control Belt		
0	1560	Conducting	0	0
1	3450	Conducting	0	0
3	5200	Conducting	0	0
7	7450	Conducting	0	0
10	9470	Conducting	0	0
17	10300	Conducting	0	0
23	13020	Conducting	0	0
28	14200	Conducting	0	0
31	16900	Conducting	0	0
35	18400	Conducting	0	0
41	23100	Conducting	0	0
		Experimental Belt A—10 phr Acetylene Black		
0	Over 10^7	Semi-conducting	0	0
5	Over 10^7	Non-conducting	1.6	1.6
6	Over 10^7	Non-conducting	1.0	1.6
12	Over 10^7	Non-conducting	2.8	3.8
22	Over 10^7	Non-conducting	9.2	Over 10
		Experimental Belt B—25 phr Acetylene Black		
0	Over 10^7	Semi-conducting	0	0
5	Over 10^7	Non-conducting	1.0	1.0
6	Over 10^7	Non-conducting	1.0	1.2
12	Over 10^7	Non-conducting	3.9	4.3
22	Over 10^7	Non-conducting	Over 10	Over 10
		Experimental Belt C—40 phr Acetylene Black		
0	5.7×10^5	Conducting	0	0
5	.....	Non-conducting	1.0	1.0
6	13.5×10^5	Non-conducting	1.2	1.2
12	36.3×10^5	Non-conducting	3.1	3.1
22	Over 10^7	Non-conducting	3.7	4.0
		Experimental Belt D—60 phr Acetylene Black		
0	3.4×10^4	Conducting	0	0
5	27.8×10^4	Conducting	0	0
6	25.4×10^4	Conducting	0	0
12	30.3×10^4	Conducting	0	0
22	19.4×10^4	Conducting	0	0

In this particular compound group a minimum of 60 phr of acetylene black was required to guarantee static safety throughout the life of the belt. All belts which passed the potential "bleed-off" test gave corresponding zero static voltage at any time during the life of the belt.

The group of five B-68 belts was placed on an accelerated power absorption test, as illustrated in Figure 7. The sheaves were also insulated to prevent "bleed-off" to the ground. The test was conducted on a dynamometer at 4.5 hp. with 71-inch belts on 5.35-inch diameter sheaves at 3500 rpm. Static voltages, resistances, and potential "bleed-off" were determined as in the dead-weight test. These data are presented in Table 4.



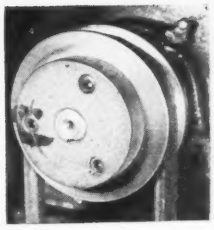


Fig. 6. Detail of Insulated Sheave for Dead-Weight Test

Fig. 5. V-Belt Dead-Weight Test with Insulated Sheaves

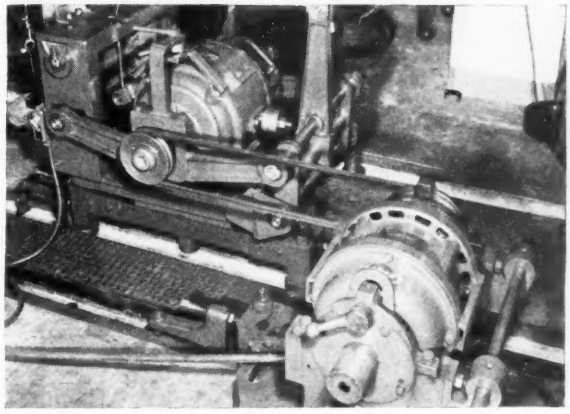


Fig. 7. V-Belt Power Absorption with Insulated Sheaves

TABLE 4. POTENTIAL "BLEED-OFF," STATIC VOLTAGE AND RESISTANCE OF B-68 INDUSTRIAL BELTS

Test Time, Days	Resistance per Unit Length, Ohms/In.	Potential "Bleed-off"	Static Voltage, KV
		Control Belt	
0	5250	Conducting	0
4	8550	Conducting	0
6	9370	Conducting	0
13	12100	Conducting	0
15	13100	Conducting	0
19	13100	Conducting	0
29	11100	Conducting	0
35	12200	Conducting	0
39	12200	Conducting	0
42	12300	Conducting	0
46	10900	Conducting	0
105	....	Conducting	0

Experimental Belt A—10 phr Acetylene Black

Tested for 119 days without failure.
Generated static voltage sporadically, but was always a low value (0-500 V.)

Experimental Belt B—25 phr Acetylene Black

Tested for three days—discontinued since no appreciable static voltage was generated in Belt A.
No static voltage generated.

Experimental Belt C—40 phr Acetylene Black

Tested for four days—discontinued since no appreciable static voltage was generated in Belt A.
No static voltage generated.

Experimental Belt D—60 phr Acetylene Black

Tested for two days—discontinued since no appreciable static voltage was generated in Belt A.
No static voltage generated.

Of all the experimental belts, only belt A was tested for a long period of time, but the static voltage generated was never an appreciable amount. The test conditions were much less severe on the power absorption test than on the dead-weight test, and less of the rubber compound

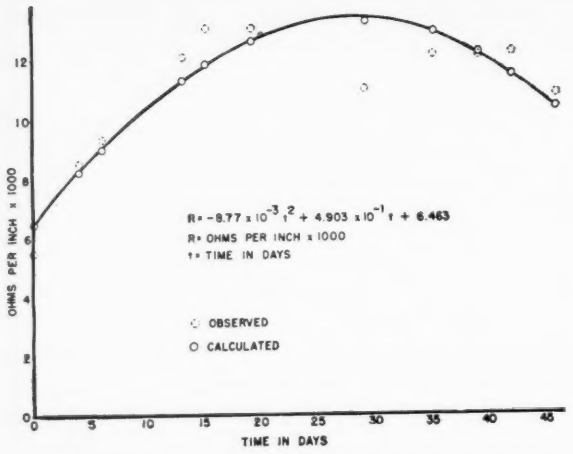


Fig. 8. Quadratic Least Squares Fit of Change of Belt Resistance with Running Time (½-Inch Top-Width Section Belt, 44 Inches O.C.)

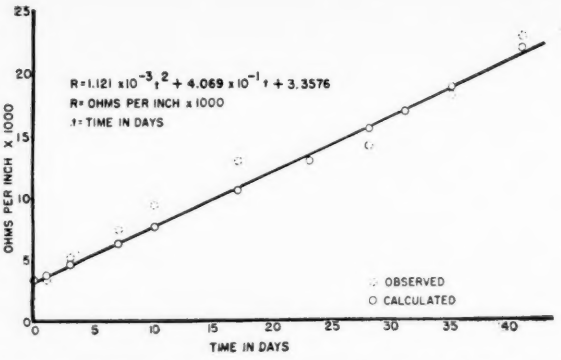


Fig. 9. Quadratic Least Squares Fit of Change of Belt Resistance with Running Time ("B" Section Belt, 68 Inches O.C.)

was abraded from the surface of the belt cover. Only 25 phr of acetylene black was required in the B-68 industrial belts to insure adequate dissipation of static charge in this particular application. This amount corresponds to the minimum quantity which gave complete "bleed-off" in a plate sample, as shown in Table 1. More severe service conditions may require a greater black loading to insure potential "bleed-off" throughout belt life.

The resistance data of the control belt in Tables 3 and 4 reveal the rate at which the conductivity of the belt decayed. These data are shown graphically in Figures 8 and 9 plotted from the regression equation as determined by a quadratic least squares fit. The regression equation represents the most probable change in resistance per unit length of the specific belts on the specific test drive during the running time.

Under a different set of conditions the regression equation may be entirely different. Figures 8 and 9 are typical, however, of the changes in belt resistance which will occur. The regression equations may be calculated by procedures outlined in standard texts on statistical analysis.[6]

Experience in the design of conductive belts has shown the resistance per unit length of a belt to be influenced by the cross-sectional area of the conductive component. This effect is illustrated in Appendix B. If the cross-sectional area of the belt cover is increased, either by increasing the size of the belt or by increasing the number of plies of the belt cover, the resistance per unit length of the belt will be proportionally reduced. It is important, therefore, that this effect be considered in designing or specifying a belt for conductive application.

Summary and Conclusions

It is common practice to define the electrical properties of a rubber product or sample in terms of specific resistance (resistivity) or conductivity. The initial measurement of the conductivities of a product, product components, or laboratory samples is not a *sufficient* criterion of adequacy that the product will be free from static effects throughout life.

Methods have been developed which measure the ability of a rubber product or laboratory sample to "bleed-off" self-generated or imposed electrostatic voltage. The electrostatic generator or induction coil is used to impose voltage in order to measure the ability of products or samples to dissipate an electrostatic charge. The electrostatic voltmeter is used to determine presence of, or degree of, the self-generated static charge on a dynamic application.

Despite the fact that the ohm resistance of a rubber product can be established, there is no means based on resistance values alone of predicting whether or not a static voltage will be generated at any time during the life of the product. The potential "bleed-off" test, however, provides a valuable and much needed direct measure of this condition. A product which is adequate in terms of the potential "bleed-off" test criterion guarantees static safety or elimination of spark discharge hazards during the useful life.

Acknowledgments

We are indebted for assistance in the collection of the data for this paper to Drs. F. Goeder and L. Weber, of Colorado A & M College, and to Dr. W. Hyslop, of the University of Denver, and to P. Carter, F. Roberts, M. Fackler, B. Jones, and E. Schock, all of The Gates Rubber Co. technical department.

We gratefully acknowledge the permission of The Gates Rubber Co. to have this work published.

Appendix A

Correction for Parallel Resistances

In order to determine the resistance per unit length of an endless belt, the circuit was considered to consist of the following:

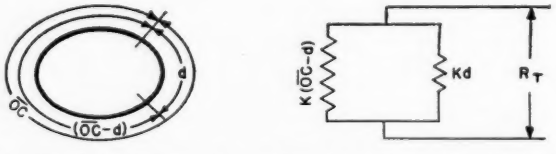


Fig. 10. Schematic Drawing of Electrical Circuit of an Endless Belt with Corresponding Equivalent Conventional Electric Circuit

Let $\overline{OC}$ = Outside circumference of the belt
d = Length of belt between test prods
K = Resistance per unit length of belt
R_T = Total resistance as measured on the belt

[6] H. A. Freeman, "Industrial Statistics," John Wiley & Sons, New York (1942).

TABLE 5. C_1 AS A FUNCTION OF DIAMETER, d, and OUTSIDE CIRCUMFERENCE, $\overline{OC}$

d In.	$\overline{OC}$—In. 20	24	28	32	36	40	44	48	52	56	60	64	68	72
2	.556	.545	.538	.533	.529	.529	.524	.522	.520	.519	.517	.516	.515	.514
3	.392	.381	.373	.368	.364	.360	.358	.356	.354	.352	.351	.350	.349	.348
4	.313	.300	.292	.386	.281	.278	.275	.273	.271	.269	.268	.267	.266	.265
6	.238	.222	.212	.205	.200	.196	.193	.190	.188	.187	.185	.194	.183	.182
8	.208	.188	.175	.167	.161	.156	.153	.150	.148	.145	.144	.143	.142	.141
8.5	.205	.182	.169	.160	.154	.149	.146	.143	.141	.139	.137	.136	.134	.132
$\frac{\overline{OC}}{2}$*	.200	.166	.143	.125	.111	.100	.091	.083	.077	.072	.067	.063	.059	.056
$\frac{\overline{OC}}{4}$†	.267	.222	.190	.166	.148	.133	.121	.111	.102	.095	.089	.083	.078	.074

* Measured across belt diameter.
† Measured across belt quadrant.

Illustrative Sample

To find the resistance per unit length (K) for a 48-inch belt whose total resistance R_T is 50,000 ohms measured at diameters $\frac{\overline{OC}}{2} = :$

C_1 from table = 0.083

$K = (0.083) \times (50{,}000) = 4150 \frac{\text{ohms}}{\text{inch}}$

Then: $\frac{1}{R_T} = \frac{1}{Kd} + \frac{1}{K(\overline{OC} - d)}$

$$\frac{1}{R_T} = \frac{\overline{OC}}{Kd(\overline{OC} - d)}$$

$$K = \frac{\overline{OC}}{d(\overline{OC} - d)} \quad R_T = C_1 R_T \text{ [Formula No. 1]}$$

where C_1 is the correction factor for the total resistance measurement. Table 5 has been set up to facilitate the computation of the resistance per unit length (K) when the measurement of total resistance is made on belts of standard lengths at various test prod distances (d).

If contact resistance is included,

$$R_T = \frac{Kd(\overline{OC} - d)}{\overline{OC}} + A = \frac{Kd(\overline{OC} - d) + A\overline{OC}}{\overline{OC}}$$

Where: A = Contact Resistance

$$K = \frac{\overline{OC}\,(R_T - A)}{d\,(\overline{OC} - d)} \qquad \text{(Formula No. 2)}$$

Formula No. 1 has been used exclusively in computing K because contact resistance is negligible with respect to belt resistance.

Appendix B

Effect of conducting belt area, resistance and resistivity are related by the following:

$$R = \frac{L}{A}$$

Where: R = Resistance in ohms
ϱ = Resistivity
L = Length
A = Cross-section area

Then in a belt: $K = \frac{R}{L} = \frac{\varrho}{A}$

Fig. 11. Cross-Section of V-Belts Showing Variation in Conductive Component

K_1 = Resistance per unit length in belt No. 1
K_2 = Resistance per unit length in belt No. 2
ϱ_1 = Resistivity of cover material
ϱ_2 = Resistivity of cover material

For the two belts illustrated in Figure 11:

$$\frac{K_1}{K_2} = \frac{\varrho_1/A_1}{\varrho_2/A_2} \qquad K_1 = \frac{\varrho_1}{\varrho_2} \times \frac{A_2}{A_1} \times (K_2)$$

The above expression allows us to obtain a resistance per unit length (K_1) in terms of a known resistance per unit length (K_2) for ratios of area and resistivities.

Rubber Shortage Hits Argentina

THE four tire plants operating in Argentina in 1950 were able to supply only 491,400 tires and 489,500 tubes in the first eight months of the year, against 755,100 tires and 804,900 tubes for all of 1949. Total output of tires for motor vehicles in 1950 is put at 738,000 units, or less than 75% of capacity, estimated at 1,000,000 tires annually (plus as many tubes), about one-third of which consists of heavy-duty tires.

Shortages of raw materials, which for one thing led to the cessation of manufacture of large truck and bus tires from the beginning of December, 1949, to late April, 1950, were responsible for the reduction in outputs. In rubber circles here it is held that Argentina could use annually about 20,000 tons of crude rubber, 400 tons of natural and 200 tons of synthetic rubber latex, and possibly about 3,000 metric tons of synthetic rubber, if it were available. The tire industry needs about three-fourths of the crude rubber. Obviously actual imports of raw materials must have fallen far short of requirements, and all types of tires seem to have been more or less scarce. The shortage in heavy-duty tires was especially severe since even at full capacity local output barely covers home needs. To relieve the situation the government permitted imports of certain sizes and also granted import permits to all rubber manufacturers for 1951 requirements of raw materials. At the same time a plan for rationing tires and tubes was announced in December, 1950, after the government had taken over all tire and tube stocks in the country.

Production of footwear in the first eight months of 1950 at 8,719,000 pairs, against 13,449,000 pairs for all of 1949, indicates some decrease in output here too. Meanwhile it is reported that Argentina's largest rubber footwear manufacturer has been proceeding with expansion plans. The concern, which now produces 28,000 pairs of rubber-soled canvas shoes daily, is said to be installing machinery in a new plant at Gutierrez, in Buenos Aires Province, which will raise daily output to about 50,000 pairs of rubber-soled canvas shoes; in addition 7,200 pairs of rubber heels and 200 pairs of rubber boots will be made daily.

A Study of the Factors Affecting the Weathering of Rubber-Like Materials—I

Earl W. Ford[1] and L. V. Cooper[2]

A REVIEW of the literature on the weathering of rubber goods is given. This review shows that ozone is the prime cause of weather checking of rubber with light, heat, and moisture being contributing factors of secondary importance.

A 60-station weathering apparatus having considerable flexibiliity is described. This apparatus makes it possible to expose rubber strips to controlled test conditions under both static and dynamic elongations. The ozone concentration is independently and continuously controllable from 0.05-ppm[3] to 4,500 ppm or even higher. The temperature can be controlled between —40° C. and 100° C. the humidity can be controlled at any value from zero up to essentially 100% R.H. at any test temperature. A system of lights and filters makes possible a complete coverage of the entire light spectrum, from 2,200 A.U. to 8,000 A.U. in bands approximately 500 Angstrom units wide.

The various control systems and the weathering apparatus itself are described in considerable detail. The ozone control mechanism is based on the continuous titration of the iodine liberated from a potassium iodide solution by the passage of a constant flow of ozonized air. The variation in the conductivity of the solution controls the operating cycle of the ozone generator and maintains the concentration at a value determined by the rate of injection of a solution of sodium thiosulfate. The temperature is regulated by the usual thermostatic controls, and the cooling is produced by dry ice. Two specially designed fixtures, each containing three AH-6 General Electric high-pressure mercury arc lamps, comprise the light source. Suitable combinations of filters, made by Corning Glass Co., enable the isolation of relatively narrow light bands in the study of the effects of light on weathering.

Some typical results are given on the reproducibility of test data, comparison of the weathering of various polymer formulations, the effects of ozone, elongation, temperature, light, humidity, and various combinations of the latter.

Butyl and neoprene stocks, in gum, black loaded and white formulations, were found to have extremely high ozone resistance.

Neoprene stocks were found to be somewhat less ozone resistant than butyl stocks.

Hevea stocks were found to be slightly better than similar GR-S stocks, but both were much inferior to neoprene.

Light alone, in the absence of ozone, was found to produce little effect in the tests conducted. Light treatment previous to or concurrent with ozone exposure had the effect of reducing effects of the ozone attack to a small extent.

IT IS well known that most rubber products exhibit a cracked or crazed appearance after exposure to the atmosphere for some time. This condition is especially true in articles which are under strain or are flexed, either continuously or intermittently. This surface deterioration is undesirable from both service and appearance viewpoints.

This cracking of the surface of rubber products has been variously ascribed to the effects of oxygen or ozone, light (including ultra-violet light), temperature variations, and moisture. These four factors are variables whose combined effects constitute what is commonly known as the "weather." Thus the cracking of the surface of rubber products (and other products as well) has come to be known as "weathering" (1)[4]. Any successful attempt to eliminate, or effectively reduce, the "exposure cracking" of rubber products would be greatly aided by a clear-cut demonstration of the role played, in the overall process, by each factor.

One of the first reports of the fact that ozone specifically caused serious degradation in cured rubber goods was given by Williams (2), and in recent years ozone has come to be regarded quite generally, as the primary cause of "exposure cracking" (1, 3, 4). The cracking of the surface of rubber products, in the presence of ozone, occurs only when the sample is under some strain.

Since ozone can produce such serious cracking in the surface of rubber samples, and since the appearance of the cracks is similar to that found in rubber products exposed to the atmosphere, it was natural to suppose that ozone in the atmosphere is the degrading agent in the "exposure cracking" of rubber. In view of these considerations a study of the ozone content of the air and a consideration of the source of atmospheric ozone appear pertinent.

Ozone was first discovered by Schonbein in 1840, although the presence of a peculiar odor in the air in the neighborhood of electrodes supporting an electrical discharge was reported by Van Marum in 1785. Subsequent attempts to measure the concentration of atmospheric ozone gave values of the order of a few parts per million parts of air. It was not until Edgar and Paneth (5) made a serious study of the problem that any really accurate determinations of the concentration of ozone in the atmosphere were made. They showed that the normal concentration was of the order of 4-6 parts of ozone per hundred million parts of air. A little later Crabtree and Kemp (6) reported a day-by-day measurement of the ozone concentration of the air covering the year 1944 at Murray Hill, N. J. Their results agreed with those of Edgar and Paneth. Crabtree and Kemp's data showed slight seasonal variations in the amount of ozone as well as a variation in the ozone content of the air, depending on the latitude.

Since ozone is present in the atmosphere, and since it is known to be unstable, a source must exist which replenishes the supply. One source is undoubtedly the action of the ultra-violet light in the light spectrum of

[1] Chemical and physical research laboratories, Firestone Tire & Rubber Co., Akron, O.
[2] Physical testing division, Firestone Tire & Rubber Co.
[3] ppm=parts per million.
[4] Numbers in parentheses refer to Bibliography items at end of this installment.

the sun on the oxygen in the atmosphere. Another source is the electrical sparks in electrical storms. Probably a large portion of the ozone is produced at high altitudes and carried down to the earth's surface by convection. The fact that the ozone concentration goes up in midsummer, when there are less fog and smoke to absorb the ultra-violet light (and also to absorb the ozone), tends to substantiate the view of the formation of ozone by ultra-violet light.

That ozone appears to cause cracking in rubber products only when the surface is under strain was mentioned above and has also been previously reported by others (7-9). Another factor which affects the degree of attack of ozone on rubber-like materials is the chemical structure of the rubber itself. Certain synthetic materials, butyl rubber for instance, are saturated compounds, which contain relatively few available free valence bonds in the molecule. These saturated compounds are much more ozone resistant than compounds containing considerable unsaturation. A third factor necessary for the ozone attack on rubber is actual physical contact. Surface layers of protective substances, although microscopically thin, are known to prevent ozone from attacking the rubber. Any break in this protective coat, however, opens the way for attack, and this break need be only of microscopic size to lead to serious cracking.

The second factor previously considered of primary importance in the "exposure cracking" of rubber goods is the action of light. Many experiments have been reported which indicated (10-12) that light, especially ultra-violet light, caused cracking of the surface. Other workers (2-3) reported that light, of certain wave lengths, produced a protective skin or surface and thus tended to reduce the incidence of cracking. Recent workers (1-3, 13-14, 21) have generally come to feel that the cracking originally ascribed to light may have been produced by ozone generated by the ultra-violet light. This belief is supported by experiments in which rubber samples were exposed to ultra-violet light in the absence of oxygen, in which case no cracking of the surface occurred (1).

Another factor considered to be of primary importance in the weathering process is moisture. Here again one finds a divergence of opinion. Some investigators (6, 15) show that washing the surface of the test sample at periodic intervals, while it is being treated with light, had some effect on the results obtained. It has also been reported that cracking was especially bad on a hazy day (15), and that humidity has no effect (1). Crabtree and Kemp (6) report that brown, soluble constituents are lost upon leaching rubber samples periodically while being treated with ultra-violet light of low intensity, and that this condition is accompanied by the appearance of a checked or crazed pattern. The pattern produced is reported not always to be typical of the compound, but to vary with the test conditions.

The final primary factor in weathering of rubber products is temperature. It is, of course, well known that exposure of rubber samples to elevated temperatures in the presence of oxygen produces a significant decrease in the tensile strength; however, no checking or cracking of the surface was found by Dawson and Scott using a Geer oven and an oxygen bomb (16). Care must thus be taken to differentiate between "exposure cracking" and other forms of heat degradation. The presence of protective agents such as waxes and of various plasticizing agents may cloud the results of experiments aimed at studying the effects of temperature on exposure cracking. Newton (1) mentions this possibility, and Crabtree and Kemp (6) show graphs of log-of time of cracking (in hours) *vs.* temperature. The cracking in this instance, however, was induced by ozone, and the temperature effect observed was one of rate rather than primary cause.

In the light of the information available it appears that ozone is the major cause of "exposure cracking" and that the other factors affect only the rate of ozone attack.

Description and Discussion of Procedures Used in Studying Weathering Effects

Many experimental methods have been devised and used for studying the effects of weathering. Probably the first method tried in the study of weathering was the simple outdoor weathering test. Rubber samples of various shapes and at many elongations were exposed to the atmosphere. Sometimes the exposure was conducted completely in the open and at other times under a protecting roof. The samples were usually tested at static elongations only. The results in many instances were inconclusive because the season of the year, the amount of dirt and fog caused variations, and the stress relaxation properties of the stocks being compared, being different, introduced other uncontrollable variations. Another factor which reduced the usefulness of tests of this type was the considerable time necessary to make the tests. The fact that the samples were tested only under static elongation also caused some apparent conflicts between experiment and practices.

Another type of weathering testing procedure is typified by the National Carbon Weatherometer (17). The basic concept of this type of apparatus is that weathering is a light initiated process. In this device a strong source of light, rich in ultra-violet, is produced by carbon arcs, and the test samples are rotated around this source of light. Various filters are used to study the effects of the various wave lengths of light. The arc itself, however, and the ultra-violet light are both possible sources of ozone, and the concentration of the latter is not regulated. Another factor, variable and uncontrolled to a large degree, is the heat emitted from the carbon arcs. Hence it is not possible to differentiate between the effects of light, ozone, and temperature. This apparatus tests samples only under static elongation conditions.

An apparatus based on the concept that ozone is the primary factor in exposure cracking, and that light, temperature, and humidity are secondary factors, was devised and described by Crabtree and Kemp (18). This apparatus consists essentially of a source of ozone, capable of maintaining a nominally fixed concentration, a test chamber with a light source, usually one rich in ultra-violet radiation, and a temperature control. Here again the samples were tested only under static conditions.

A type of apparatus for the study of the weathering of samples under dynamic conditions was developed by Throdahl (19). In this work the samples were flexed to varying degrees either in the presence or absence of light from a General Electric type S-1 sun lamp. The samples did not crack in the absence of the light even when flexed up to 100 hours, nor did the specimens crack in the presence of the ultra-violet light when unstretched for exposure times up to 50 hours, although slight cracking appeared in 100 hours. When cracks were obtained, they were reported to be at right angles to the strain, which is typical of ozone checking.

Another dynamic weathering device was reported by Fielding (20) at about the same time. This device was used outdoors and was primarily a device to permit the study of the effect of outdoor weather on the test strips under dynamic flexing conditions.

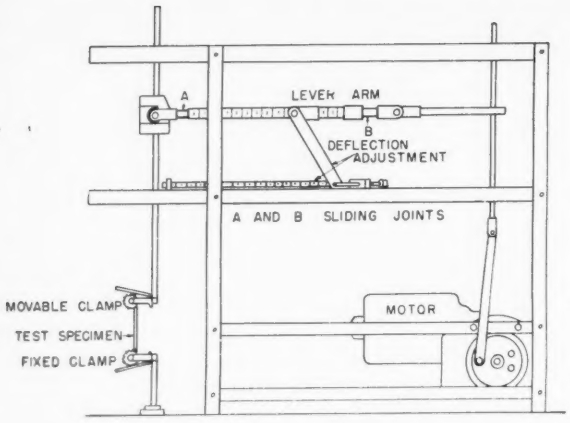


Fig. 1. Single-Stage Dynamic Flexing Apparatus

Features Incorporated in the Design of the Firestone Weathering Apparatus

It is evident from what has been reported above that a great multitude of problems is present in any weathering test and in any attempt to correlate the results obtained in the laboratory with those obtained in practice. These difficulties can probably never be completely solved. Any attempt, however, to make a serious analysis of the part played by the various weathering factors is dependent upon being able to control each variable at a fixed value and to eliminate or reduce cross-effects such as the heating of the surface by the lights, the generation of ozone and hence the variation of the ozone concentration due to the ultra-violet light, or the destruction of the ozone by elevated temperatures, or by humidity.

With these and other factors in mind an attempt was made to design a completely independent control of ozone concentration, light intensity and wave length, temperature, and moisture. Flexibility in the methods of exposing the test specimens to the various weathering agents was also considered essential. The objective of flexibility led to the incorporation in the apparatus design of means for testing static and dynamic samples concurrently over a range of elongations and at different flexing rates, for the dynamic samples. The wave length and intensity of light and the time of exposure to light were also made variable and controllable. Facilities for washing or spraying the samples at desired times and for a sizable number, 30 dynamic and 30 static, of test positions were incorporated in order to allow latitude for comparisons of several stocks under identical test conditions.

Detailed Description of Firestone Weathering Apparatus

The apparatus for the study of weathering consists of a sample chamber, which is equipped with means for flexing the samples and in which the several test conditions can be varied. In this test chamber are two concentric tables mounted one above the other and rotated by the same shaft. Sixty speciment clamps are equally spaced about the edge of the lower table. Projecting downward through the upper table at the appropriate radius are support rods for the upper set of clamps. These support rods are placed in such a way that each group of three rods supports the ends and junction of two curved bars, which bars form a curved surface that extends over one-sixth of the arc of the lower plate and have ten specimen clamps mounted thereon. Alternate groups of three support rods are simply equipped with threads so that the spacing between upper and lower set of clamps can be set to a predetermined value by a simple adjustment. These three groups of ten stations each constitute the static test stations.

The remaining nine support rods are attached, through a lever system for each rod, to a "cross-head" which is in turn attached to a movable shaft placed concentric to the turntables. The lever arms are so constructed as to permit telescoping at each end in order to allow the two ends to reciprocate vertically. The fulcrum for each lever arm is movable so that the vertical motion imparted to any one rod can be varied from zero to an amount equal to the vertical motion of the "cross-head." These three groups, of ten stations each, constitute the dynamic test stations.

It is possible then to maintain each sample of a static group of ten samples at the same elongation, or at a predetermined range of elongations. Using the dynamic stations it is possible to flex up to ten samples at the same elongation or to make a progressive variation in per cent. elongation from zero at one end of a group of ten samples to 100% elongation at the other end of the group of ten stations (by means of a simple adjustment of the fulcrum positions). Suitable guides are provided to insure vertical motion of the support rods in the dynamic groups of stations. Swivel connections are placed between the outer support rods and the curved bars in each group of dynamic stations to prevent torsional strains during the flexing motion. This arrangement insures that each upper clamp moves vertically above its matching clamp which is on the lower plate.

Figure 1 shows a schematic diagram of a single-stage dynamic flexing apparatus.

By the use of an automobile transmission and a crank arm, which permits the central shaft of the complete machine to be reciprocated in a vertical direction at different speeds, the samples, held between the fixed and movable clamps, can be flexed. Another drive

(*Continued on page* 701)

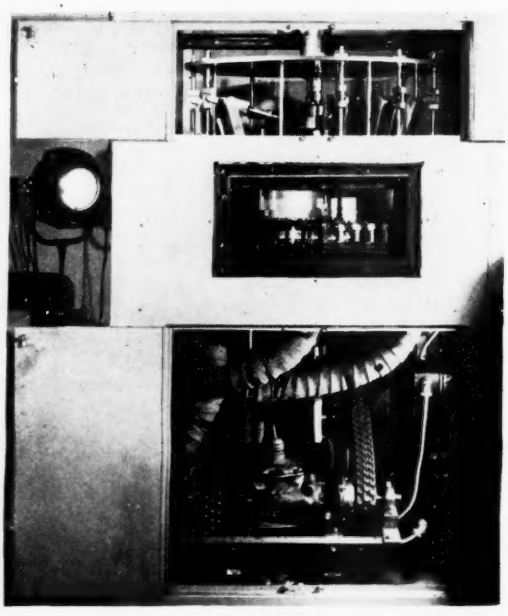


Fig. 2. Test Chamber and Drive

Properties of Natural Rubber Latex from Clonal and Seedling Trees of *Hevea brasiliensis*—II

G. A. Kidder[1]

THE following installment concludes the article, begun in our August issue, dealing with investigations by the Firestone Plantations in Liberia on the properties of latices from several clones, which were then compared with latices from seedling trees.

Clonal Differences

The property which showed the greatest regular variation from clone to clone was the mechanical stability of the aged concentrate. As may be seen from Table 3, the average mechanical stabilities for 30-day-old ammoniated concentrates varied from 309 seconds for War. 4 to 916 seconds for PB. 186. This variation was one of almost 300% between the extremes. Other properties showed regular variations, but none were so marked as this one. If we consider the average mechanical stabilities for 30-day-old concentrates as a guide to the latex quality we can see that five of the latices, (AV. 49, AV. 50, AV. 152, BD. 5, and BD. 10) fall into one group with stabilities just a little below those of seedling latex, and three of the latices (Tj. 1, Tj. 16, and War. 4) have stabilities considerably below those for seedling latex; while one of the latices (PB. 186) has stabilities greater than those for seedling latex. While the data presented here are averaged over several years, these latices have in general retained their respective positions in each year. It has been possible to attribute the few changes in order which have occurred from year to year to such factors as: the height of the tapping panel; the type of bark i.e., virgin or renewed; union effects; opening effects for new panels, etc.

It is well to mention here that while the data for this paper are all from latices obtained from half spiral alternate daily tapping (S/2, d/2, 100%) a similar experiment was carried on for two years with latices obtained from half spiral periodic 15-day tapping (S/2, 15d/30, 100%). The data for the samples from alternate 15-day tapping led essentially to the same conclusions as are presented here, but were somewhat more difficult to interpret owing to variations in quality within the 15-day tapping cycle.

An examination of the concentrate viscosities in Table 3 shows that with a few exceptions the viscosities are in inverse order to that of the mechanical stabilities, but that the greatest variation is only about 30%. For latices of the same age this inverse relation between mechanical stability and viscosity seems to be fairly well established. Thus viscosity may be used as a measure of quality, but the range of variation is considerably less than for mechanical stabilities.

The mechanical stabilities or viscosities for 30-day-old feed latices can also be correlated with those for the concentrates prepared from those feeds, but in general measurements made on the feed latices were less reliable and showed smaller ranges of variations than did those made on the concentrates.

The average total solids content of the feed latices were quite closely grouped, varying only from 35.2 to 40.8%. Despite this relatively small variation there was a high degree of uniformity—the relative total solids content of the various latices from year to year indicate that there are definite clonal differences in feed total solids. The differences in feed total solids are not obviously related to the clonal differences in any other property although they may contribute to such differences, as discussed in the previous section.

Since a high KOH number and a low mechanical stability are characteristic of a latex which has started to putrefy, it might be expected that there would be an inverse relation between KOH number and mechanical stability in concentrates of the same age. Actually if we consider only War. 4 and PB. 186 which have the lowest and highest 30-day mechanical stabilities, respective-

[1] Firestone Plantations Co., Liberia.

TABLE 3. AVERAGE VALUES FOR VARIOUS PROPERTIES OF 30-DAY-O D LATICES FROM SAMPLES COLLECTED WEEKLY OVER A FOUR-YEAR PERIOD

		Feed*					Concentrate*					
Type of Latex	Number of Samples	% Total Solids†	KOH Number	Mech. Stab. Sec.	Viscosity‡	Ash Content§,† %	% Total Solids†	KOH Number	Mech. Stab. Sec.	Critical Stab. Temp.‡	Viscosity‡	Acetone Extract§,† %
AV. 49	190	36.5	1.33	1003	77	1.40	62.3	.61	676	68	224	2.53
AV. 50	192	40.3	1.28	1046	78	1.38	61.2	.66	678	69	221	2.64
AV. 152	191	40.8	1.24	839	79	1.40	62.2	.64	611	68	218	3.61
BD.5	192	40.5	1.19	1047	77	1.26	61.9	.65	666	69	211	2.79
BD. 10	191	37.8	1.23	1018	79	1.50	62.8	.59	659	67	194	2.48
Tj. 1	189	40.3	1.14	668	78	1.11	62.3	.59	463	68	237	2.67
Tj. 16	180	35.2	1.26	750	81	1.44	62.5	.57	423	66	249	2.66
War. 4	192	37.8	1.48	668	85	1.37	62.0	.69	309	68	264	2.77
PB. 186	192	36.5	1.30	1181	78	1.39	62.2	.61	916	69	203	2.68
Seedling	328	36.2	1.35	1032	79	1.44	62.5	.60	792	68	193	2.96

†Determined on one-day-old sample instead of 30-day-old.
‡Average for three years only.
§Average for two years only.
*The ammonia content of the feed latex was adjusted to 1% for storage and at 30 days averaged 0.92%. The ammonia content of the concentrates was adjusted to 0.70% and at 30 days averaged 0.67%.

ly, we do find that the War. 4 latices always have higher 30-day KOH number than do the PB. 186 latices. This point is true both for the 30-day-old feeds and concentrates. This correlation, however, breaks down completely for other cases; thus, Tj. 16, which is one of the lowest stability clones, has the lowest average KOH number for the 30-day-old concentrates. This is not surprising when it is remembered that the KOH number measures the concentration of both stabilizing and destabilizing materials. Thus a knowledge of the total KOH number is not sufficient; it is also necessary to know the distribution between stabilizing and destabilizing materials before we can fully characterize a given latex.

The ash content of the feed latices were also rather closely grouped. The Tj. latices, however, were consistently lower in ash content than the other latices.

The only outstanding difference in the amount of acetone extractable material was exhibited by AV. 152, which gave considerably higher values than any of the other latices. AV. 152 concentrate films had an acetone extract of 3.61%; while the other latices all had between 2.48 and 2.96%.

Clonal Differences in Aging Behavior

In the previous section the average data for 30-day-old latices were considered, and it was shown that for latices of the same age there were consistent clonal differences in certain properties. This study has also revealed that there are consistent differences in the behavior of the various clonal latices during aging. The greatest differences were observed in the case of mechanical stability. In Table 4 the average mechanical stability data for the various types of latices at different storage times are given. In Figure 3 these same data are plotted for four selected clones. Since no mechanical stabilities above 1,200 seconds were recorded, it has been necessary to estimate a portion of the curve for PB. 186. From these curves it is apparent that clonal differences exist in the aging time at which the maximum stability occurs, as well as in the magnitude of the stabilities obtained. It is also apparent that the comparison of clonal stabilities would have been somewhat different if they had been based on samples stored for 180 days rather than on those stored for 30 days.

The shape of this curve for a given latex has been consistent from year to year. The apparently characteristic behavior for each type of latex is probably related to the chemical composition of the latex. According to the theory presented previously, these characteristic curves would tend to indicate characteristic clonal ratios for the initial concentrations of hydrolyzable fats and proteins.

TABLE 4. AVERAGE MECHANICAL STABILITY FOR EACH TYPE OF LATEX AT EACH STORAGE PERIOD FOR FOUR-YEAR PERIOD, **1944-1947**

Type of Latex	Length of Storage, Days				
	7	30	90	180	360
AV. 49	320	790	953	924	569
AV. 50	287	762	841	764	392
AV. 152	222	598	805	799	463
BD. 5	262	795	904	826	535
BD. 10	230	750	817	744	391
Tj. 1	208	541	818	830	524
Tj. 16	183	443	717	758	489
War. 4	147	333	479	490	293
PB. 186	371	955	1076	1067	758
Seedling	350	869	975	922	543

In Figure 4 similar data for KOH number are plotted. In the period between 30 and 180 days it is interesting to note that both Tj. 1 and War. 4 do not taper off to a steadily increasing value until much later than PB. 186 and AV. 50. By referring to Figure 3 it can be seen that these two clones were also slower in reaching their maximum stability. It would seem, then, that there is a correspondence between the period in which the KOH number is rising rapidly and the period during which the mechanical stability is increasing. Between 180 and 360 days the clones all show a slow steady increase in KOH number at about the same rate.

Miscellaneous Observations

It is impossible for such a study to be carried on over a period of years without a large number of qualitative observations being made. Some of the more important of these are discussed in this section.

On clonal trees, as the tapping cut approached the budgraft union, abnormal changes in properties were often noted, particularly in the case of War. 4, for which the average mechanical stability increased considerably as the tapping cut approached the union. This condition was attributed to a mixing of higher stability latex from the seedling stock with lower stability latex from the War. 4 scion.

When new panels were opened, the latex obtained for the first few tapping days was considerably lower in mechanical stability and higher in KOH number than was

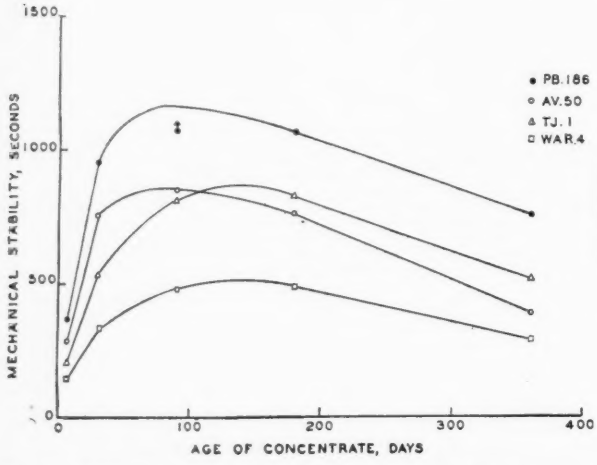


Fig. 3. Changes in Mechanical Stability of *Hevea* Latex Concentrates with Age for Selected Clones

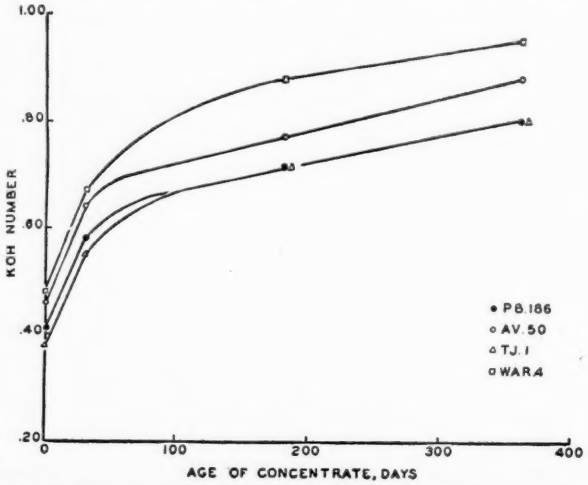


Fig. 4. Changes in KOH Number of *Hevea* Latex Concentrates with Age for Selected Clones

normal for that clone. In some cases this effect appeared to extend over a month or more.

Latex obtained from high panels, particularly those over 40 inches, had lower mechanical stability, higher KOH numbers, and higher average feed total solids than latices which were obtained from low panels on the same clone.

When the tapping cut progressed from an area of virgin bark into an area of renewed bark, the mechanical stability of the resulting concentrates definitely decreased.

Considerable differences in the centrifuging characteristics of the latices from the various clones were observed. For example, in the same centrifuge and with the same settings and conditions a sample of feed from PB. 186 would give a higher total solids concentrate and lower total solids skim than a sample of feed from War. 4, even though the two feed latices had the same total solids content. This difference is at least partially explained by the consistent difference in viscosity for these two latices.

The dried film from War. 4 feed latices turned black on standing. This blackening was also noticed for Tj. 16 during a low stability period for that clone. This may indicate that enzymatic action has something to do with the low stability of these latices.

Summary

More than 2,000 samples of latex were collected from nine clonal areas and one seedling area over a period of four years. Each sample was centrifuged, and the concentrate prepared was ammoniated and subjected to a series of tests at various storage periods running up to 360 days.

While the primary object was to evaluate differences in the latex due to clonal origin, it was also necessary to consider two other general causes of variation. First, the changes which occur in the various properties studied during aging are discussed and theories proposed to account for the changes which occur. Second, the changes in properties which occur at different seasons of the year are discussed, and it is shown that most of these changes are directly related to the rainfall and to the wintering and refoliation of the trees.

When these two factors are taken into account, the main differences which can be attributed to clonal origin are: a considerable variation in mechanical stability; a related but inverse relation for viscosity, and unrelated differences in KOH number. It is also shown that there are relatively small but consistent differences in the feed total solids for the different types of latex. Tj. 1 had a considerably lower ash content than the other clones, and AV. 152 had a considerably higher acetone extract than the others.

It was also shown that there are consistent clonal differences in the way in which the mechanical stability and KOH number change with the age of the latex. It is shown that these differences are consistent with the theories which have been suggested in the previous section.

A series of qualitative observations are given which were made over a period of several years during the course of this work.

Acknowledgments

The author is indebted to E. M. Glymph and J. S. Wood, Jr., who carried out most of the early work on this project; to K. G. McIndoe and G. P. Spangler and other members of the botanical division who have supervised the field work on this problem; to D. H. Walters and others who have supervised the routine laboratory testing; and finally to the Firestone Plantations Co. for the opportunity to carry out and to publish this work.

Factors Affecting Weathering

(*Continued from page 698*)

rotates the complete turntable mechanism so that all test specimens can be subjected, in turn, to exposure to the system of lights or water spray.

Surrounding the turntable is an enclosing shell provided with four windows for lights and access to the test chamber. Liquid seals are provided to make the test chamber gastight and at the same time permit rotation of the turntable. By suitable placement of a seal between the two tables, a test chamber in the shape of a doughnut of rectangular cross-section is obtained. This test chamber is comparatively small, and as it is insulated, it is possible to maintain it quite easily at a constant value over a considerable range of temperatures. A system of duct work permits the circulation of the air through either a heating or refrigerating unit for temperature control.

Figure 2 shows a photograph of the complete chamber and drive mechanism.

Inlets for ozone, moisture, in the form of steam, water spray, air sampling, temperature and humidity controls, etc. are provided at convenient points.

The test chamber is tight enough to permit use of atmospheres enriched in various gases. However the pressure permissible is only slightly above that of the atmosphere.

The windows are so constructed that filters of various wave length characteristics may be used.

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(*To be continued*)

Editorials

What Will Be the Rubber Policy This Time?

RECENT statements by two rubber industry leaders, P. W. Litchfield, chairman of the Goodyear Tire & Rubber Co., and John L. Collyer, president of The B. F. Goodrich Co., have highlighted the fact that the time is rapidly approaching when the government has to decide what sort of national policy in rubber we shall have for the next few years.

The Rubber Act of 1948, which became law in April, 1948, and was renewed for another two years in June, 1950, expires on June 30, 1952. The Administration views on the disposal of the synthetic rubber plants owned by the government must be reported to Congress by January 15, 1952.

Litchfield, in his statement of June 30, was criticical of the management of the synthetic rubber plants and emphasized that facilities for the production of synthetic rubber must be greatly expanded to take care of future domestic and world demands for new rubber, since no appreciable amount of increase in natural rubber production could be hoped for.

Collyer, during August, recommended that the President appoint a Special Commission "of the character of the Baruch Committee" to study the problem of the completely "socialized" rubber industry. He pointed up the problem by stating that "Government owns the rubber producing plants, procures the raw materials and schedules production, is the only buyer and importer of crude natural rubber, determines the amount of rubber that may be consumed by manufacturers, sets the specifications for the use of rubber, and determines the price."

It has been emphasized repeatedly in this column, and elsewhere, that national policy in rubber suffers most because of the lack of a central administering agency with sufficient authority to resolve disputes between the several agencies of the government concerned with rubber and between these agencies and the industry. A case in point is the dispute that has been going on for many months between the government agencies and between some of them and the industry as to the size of the natural rubber stockpile.

The National Production Authority, with the help of industry technicians, completed in April a revision of previous estimates of the amount of natural rubber needed for military uses for a five-year war. The Munitions Board was asked for its views on these new calculations since they indicated that they might allow a lowering of the stockpile requirement. No reply to this request or subsequent ones for comment has ever been received from the Munitions Board.

Although no one in a responsible position in government has adopted the industry's contention that the amount of natural rubber in the present stockpile is adequate, it has been indicated that agencies other than the Munitions Board believe that some downward adjustment might be made.

A further complication at the present time is the fact that the government has practically discontinued natural rubber buying while efforts have been devoted primarily to propaganda aimed at lowering the price on world markets.

Since any relaxation in the amount of control the government exerts on the rubber industry is to a very great extent dependent upon when the natural rubber stockpile is achieved, the decision of the Munitions Board on this matter is the key to the whole situation.

The President, during August, instructed the National Security Resources Board to gather their views as the basis for presidential recommendations for the disposal of the synthetic rubber plants by January 15, 1952. We think that much more than recommendations for the disposal of the synthetic rubber plants is needed and that the "Special Commission" recommended by Collyer is an urgent necessity. Unless some means can be found to break the deadlock between the Munitions Board and other government agencies concerned with rubber and with the industry on this matter of the size and the means by which our natural rubber stockpile is acquired, the industry may remain completely "socialized" for several more years. Vigorous industry and public support for "liberation" of the rubber industry is essential during the coming months when national policy on rubber is being decided.

Technically Classified Natural Rubber

IT WILL be to the advantage of rubber goods manufacturers in the United States to participate in the program of evaluating Technically Classified Natural Rubber, a development of the natural rubber producing organizations and about which mention has been made in India RUBBER WORLD and elsewhere in the recent past.

During August, The Rubber Manufacturers Association, Inc., issued a bulletin on the subject of technically classified rubbers to purchasing agents and rubber goods manufacturers and included literature from the International Rubber Research Board, London, England, the coordinating agency.

R. G. Seaman

DEPARTMENT OF
PLASTICS TECHNOLOGY

After-Treatment of Molded Polystyrene Parts[1]

Charles J. Snyder[2]

POLYSTYRENE production has skyrocketed from 15,000,000 pounds in 1943 to 256,000,000 pounds in 1950. This progress has been accomplished by numerous advancements in the manufacture of the polymer and in post-handling of the products made from it.

Material manufacturers have been constantly striving to improve the basic character of polystyrene in order to better its moldability; physical, chemical, and electrical characteristics, color constancy, and physical form. Hand in hand with the improvements made by manufacturers have been the developments engineered by other factors in the industry. These steps have further improved polystyrene products after the polymer manufacturer had turned out his best product. As a result, advancements have been made in the size, shape, and complexity of these products, eye appeal and durability of the final product.

Some of these advancements have been made by the molders and extruders through improvements in equipment operation and manufacturing techniques. Designers and producers of tools and dies, in cooperation with molders and extruders, also have been responsible for a portion of this advancement. The most important progress was made however, when molders, extruders, raw material manufacturers, and industries not previously allied with the plastics industry worked together to aftertreat molded and extruded polystyrene parts in ways to provide consumer goods of wider use and appeal. It is upon this latter phase of the manufacture of polystyrene products that this paper is based.

Types of After-Treatments

Dependent on the result desired, many operations are now commonly employed to after-treat molded polystyrene parts. Machining, fabrication, and finishing are employed to enhance appearance and to make complex parts from simpler ones in order to fill more useful functions. Surface coating of polystyrene parts with surface active agents, such as the common synthetic detergents, and with more permanent materials such as lacquers, destaticizes the part. This treatment eliminates the abnormal collection of dust on the part which decreases eye appeal and retards sales while the part is on the retailer's shelf. With the advent of decorating polystyrene parts by painting, lacquering, printing, hot stamping, silk screening, and metalizing, new outside interest was introduced and aided in the expansion of the plastics industry. New markets were opened, and sales expanded.

[1] Presented before National Technical Conference, Society of Plastics Engineers, Inc., New York, N. Y., Jan. 19, 1951.

[2] Technical specialist in plastics, Koppers Co., Inc., Pittsburgh 19, Pa.

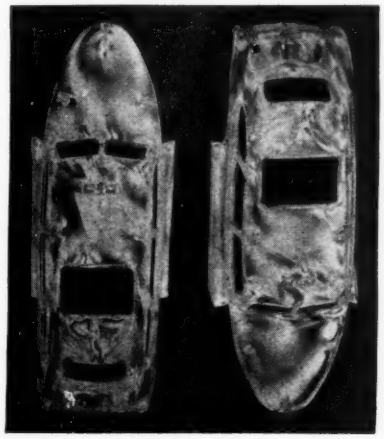

Fig. 1. Internal Stresses in Molded Polystyrene Parts as Shown by Polarized Light

There can be do doubt that after-treatment of molded polystyrene parts has contributed measurably to the growth of the industry and to increased sales volume. These treatments in the main, however, have been a carryover of previous experience in other industries. The major problem involved has been modification and adaptation of previous knowledge to a new industry and new materials. This is progress and requires ingenuity, but still this procedure utilizes certain hand operations which produce results immediately apparent to the eye.

On the other hand, during the past two years molders and distributers have been harassed by the crazing and cracking of polystyrene parts without apparent cause either in transit, in storage, or on merchants' shelves. At first it was believed that inadequate packing and rough handling were responsible for this defect. After considerable study, however, it was learned that this difficulty resulted from the self-relief of stresses within the part. Thus an intangible, but very important factor was introduced which gave impetus to programs of annealing as an important after-treatment of polystyrene molded parts.

Inasmuch as each of the foregoing methods of after-treating polystyrene molded parts represents an important phase of polystyrene product manufacture, no single article could cover them thoroughly without becoming long and involved. Therefore the after-treatment of polystyrene molded parts by annealing has been selected as the primary theme of this discussion. Annealing only recently has become an important factor in the plastics industry, and detailed factual data have not been readily available. Furthermore, high labor costs, material shortages, and keen competition make the annealing method of saving molded parts attractive and worthy of detailed study.

Stress Relief by Annealing

Until recently the word "stress" was strictly an academic term in a practising plastics engineer's dictionary when it was used to denote anything other than external forces on a piece of equipment or plastic product. Very few people except those in polymer research and development groups were conscious of locked-in internal stresses in molded plastics. Only recently have strains in the form of cracking, crazing, and often complete breakup of a part been correlated with the magnitude and the pattern of these internal stresses. Such internal stresses are created either by unbalanced molding conditions of time and temperature, by external loading, or by a combination of both.

In a transparent part, internal stresses can readily be seen when polarized light is passed through it (see Figure 1). It will be noticed that the lines of stress form a rainbow pattern which generally follows the lines of the flow of the plastic. The heaviest stresses appear at points of turbulent flow, such as at the gate; or at points where the flow is abruptly broken, such as around core pins. On the other hand, the stresses decrease along planes of long flat flow. A completely stress-free part will not show any pattern, but will exhibit an allover grayness when polarized light is passed through it. An example of such a part is a compression molded piece where all stresses are removed before it leaves the press. In order to prevent these stresses from becoming visible strains, it is necessary to eliminate or at least partially relieve the major stresses.

Annealing, the process of freeing from internal stress by heating and gradually cooling, consequently becomes important. The annealing of a molded polystyrene part means to relieve, either partially or totally, the major stresses and strains set up in the part during injection molding, machining, fabricating, or by external loading.

Fortunately annealing of polystyrene parts is a mechanical operation and readily accomplished in practically any plant or shop. The facilities available and the plant costs will determine the method selected. While annealing of a molded polystyrene part can occasionally be accomplished in the molding machine before the die is opened, cost considerations generally preclude this practice. The effectiveness of this method will be demonstrated later.

Types of Annealing Equipment

The three most common types of equip-

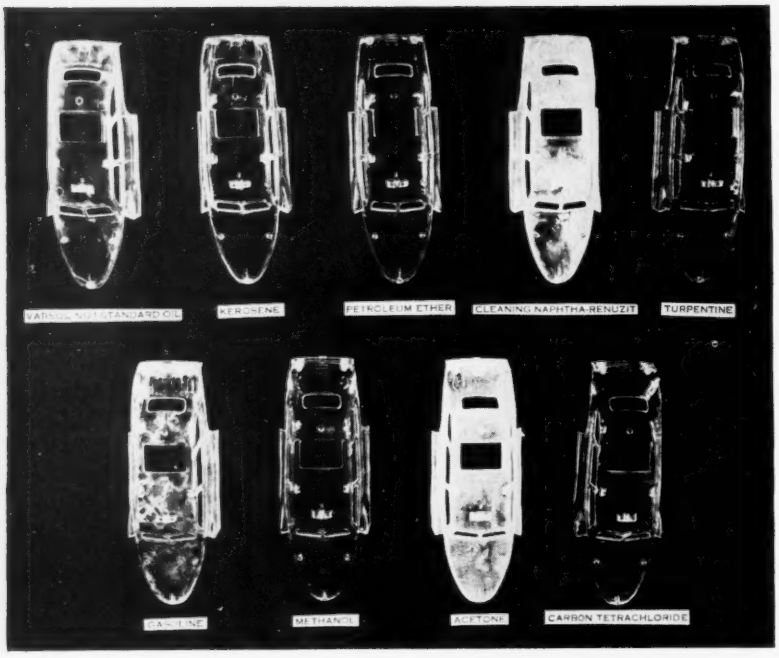

Fig. 2. Stress Cracking of Unannealed Molded Polystyrene Parts as Shown by Solvent Dip Tests

has been evolved which has since proved satisfactory.

Earlier work in polymers suggested the use of a simple immersion test in kerosene to determine the tendency of polystyrene molded parts to craze and crack. As a result of additional investigations, other solvents have been frequently substituted for kerosene because they appear to reveal more of the hidden stresses faster.

In the present work, nine solvents were chosen, in order to (1) determine the effect of various solvents in revealing heavy stresses and (2) determine which solvents could be used successfully and interchangeably in the dip test. The solvents chosen were Varsol No. 1, kerosene, petroleum ether, Renuzit (a commercial cleaning fluid), turpentine, motor gasoline, methanol, acetone, and carbon tetrachloride.

The three solvents that did not show up the stresses in the unannealed parts were methanol, acetone, and carbon tetrachloride. Previous experience had already indicated that these solvents were unsatisfactory for the purpose, but they were included in order to demonstrate this point. As is shown in Figure 2, methanol has no effect on polystyrene; acetone etches and swells polystyrene; and carbon tetrachloride is a solvent for polystyrene. However, in order to complete the test program, these solvents were used in all phases of the solvent test work.

The solvent diptest method used in this work is composed of three steps, as follows:

ment used to accomplish annealing successfully are: (1) a thermostatically controlled air oven, preferably of the circulating type; (2) a controlled warm water bath; and (3) an enclosed adjustable bank of infrared lamps.

The air oven has proved a very satisfactory means of annealing polystyrene parts. Since most molders have tray driers as standard equipment, ovens are commonly used. Usually the molded products are stacked in an orderly fashion in the oven so as to permit warm air thoroughly to surround the parts and provide uniform annealing. Sometimes parts are stacked in a random fashion, but if there is sufficient air space around the parts, they will anneal properly. Usually the length of time in the oven has to be increased to permit thorough and uniform heating when the parts are randomly stacked.

When oven facilities are not available, it has been found expedient to use a warm water bath arrangement. Any insulated vessel is satisfactory, but for best results a bath having a thermostatically controlled immersion heater and stirrer is desirable. Satisfactory results, however, have been obtained when using equipment in which an immersed steam line was the heat source and the water temperature was closely controlled. Annealing is more complete and faster when parts do not touch or nest, and the warm water circulates freely around them.

The third method of annealing utilizing standard equipment is by means of infrared radiation. Parts laid out on a flat surface are exposed to infrared radiation generated by means of a bank of infrared lamps mounted above them. It is advisable to have the height of the lamps above the parts adjustable in order to control the temperature. There will be less heat loss and faster annealing if the entire installation is enclosed to prevent air currents from disturbing the dead heat. A simple way of measuring temperature to insure constancy is to place a thermometer horizontally on top of the parts to be annealed.

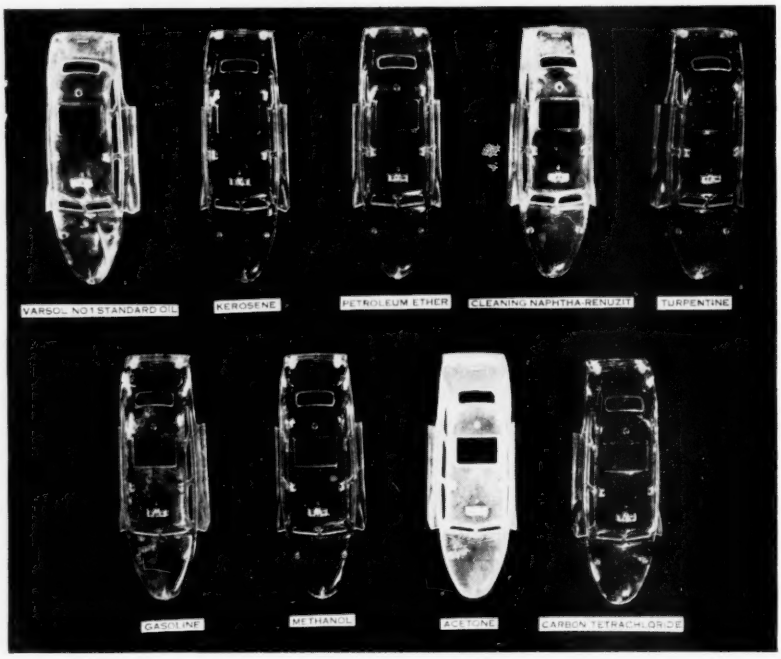

Fig. 3. Results of Solvent Dip Tests on Molded Polystyrene Parts after Annealing in an Air Oven at 150° F. for 60 Minutes

Stress Relief Tests

In order to insure that stresses are properly relieved to prevent service trouble, it is necessary to evolve a fast and simple test to check (1) whether or not the part actually requires annealing and (2) when annealing is satisfactorily accomplished. Storage tests take too long, and thermal shock or cycling tests are involved and complex. Consequently a solvent dip test

(1) Cool the test parts and solvent to room temperature (70° F.).

(2) Immerse the part in solvent for one minute.

(3) Remove the part from the solvent and allow it to drain and air dry.

Stresses of troublesome magnitude will generally show up as strain cracks within five minutes after the solvent has evaporated from the molded part.

For these detailed studies, parts were

molded with a cool die to insure that the pieces would be heavily stressed and would not have the advantage of any die annealing. As a result, numerous heavy strain cracks developed in unannealed parts when solvent dip testing was applied.

These specimens were molded under the following conditions:

Molding machine	8-ounce Reed-Prentice
Die	Two-cavity; total weight of shot—5.4 ounces.
Material	Koppers Polystyrene 8X
Cyclinder temperature	600° F. front and rear
Die temperature	85° F. front 95° F. rear
Nozzle	Off
Injection pressure	700 pounds
Injection time	12 seconds
Cool time	18 seconds
Booster time	3½ seconds
Open time	5 seconds

The molded specimens were subjected to the following annealing conditions. After treatment they were solvent dip tested.

Annealing Equipment	Annealing Time Minutes	Annealing Temperature, °F.
Unannealed	..	..
Air circulating oven	15	150
	30	150
	60	150
	15	160
	30	160
	15	170
	30	170
Water bath	15	150
	30	150
	15	160
	30	160
	15	170
	30	170
Infrared radiation	15	150
	30	150
	15	170
	30	170

In addition to molding parts to provide heavily stressed parts, two other sets of molding conditions were tried. First, an attempt was made to establish the highest production rate, or shortest cycle, in order to determine the effect of very rapid molding and cooling on the magnitude of locked-in stresses. Second, an attempt was made to set a production rate, primarily by increasing die temperatures and cycle and lowering cylinder temperature, that would make parts reasonably free of stress before the die was opened.

The molding conditions on these two trials follow:

	Minimum Cycle	Annealing Cycle
Cylinder temp., ° F.—Front	620	475
Rear	600	475
Die temp., ° F.—front	85	150
Rear	95	150
Nozzle	Off	Off
Injection pressure, lbs.	900	900
Injection time, sec.	7	8
Cooling time, sec.	8	16
Booster time, sec.	3½	3½
Open time, sec.	5	5

Results of Tests

The detailed results of all test work are shown in the table at the end

A consideration of the results of solvent testing on the foregoing series indicates:

(1) Annealing temperatures are of primary importance with annealing time of secondary importance, but neither can be independent of the other.

(2) Molding conditions are the major factors in the control of locked-in troublesome stresses in molded polystyrene parts.

(3) Solvent dip testing is a fast, effective, and conclusive method of testing a polystyrene part to determine whether it needs to be annealed and/or whether it has been satisfactorily annealed.

Summary and Conclusions

The purpose of this discussion has been to present the factors involved and the advantages to be gained when annealing is used to prevent the loss of polystyrene parts. Annealing can effect considerable savings by decreasing the possibility of field complaints which lead to the return and scrapping of finished products.

Annealing Methods	Temperature, °F.	Time Minutes	Comments
Unannealed	..	..	Badly cracked all over. Varsol No. 1 treated specimens show the most cracks and petroleum ether and turpentine the least.
Air oven	150	15	Slight cracking still evident with Varsol No. 1 showing heaviest stress attack.
	150	30	Annealed—no cracks.
	150	60	Annealed—no cracks (see Figure 3).
	160	15	Only Varsol No. 1 treated specimens show very slight cracks.
	160	30	Annealed—no cracks.
	170	15	Annealed—no cracks.
	170	30	Annealed—no cracks.
Water bath	150	15	Slight cracking evident.
	150	30	Annealed—no cracks.
	160	15	Only Varsol No. 1 treated specimens show very slight cracks.
	160	30	Annealed—no cracks.
	170	15	Annealed—no cracks.
	170	30	Annealed—no cracks.
Infrared	150*	15	Heavy cracking apparent all over.
	150*	30	Moderate cracking.
	170*	15	Moderate cracking all over.
	170*	30	Slight cracking.
Unannealed	Minimum Cycle		Very heavy large cracks all over.
	Annealing Cycle		Slight cracking.

* Inasmuch as the infrared annealing equipment was not totally enclosed, air currents reduced temperatures surrounding the parts, thereby decreasing the efficiency of the operation.

New Vinyl Stabilizer

DUTCH BOY CS-137, a new stabilizer for transparent vinyl plastics, has been developed by National Lead Co., 111 Broadway, New York 6, N. Y. A barium-sodium complex, the new product is suitable for use in vinyl film and sheeting wherever exceptional light stability is of importance, such as in raincoats, upholstery, drapes, and similar products. Another claimed advantage of the stabilizer is that it will not stain vinyls when in contact with sulfur. Evidence of the products's excellent resistance to light exposure is shown by the fact that 6,000 hours in a Weather-Ometer found CS-137 substantly unchanged; whereas formulations generally accepted for light resistance usually fail in less than 1,000 hours.

Hold Golf Tourney

THE Chicago Section, SPE, and Midwest Chapter, SPI, held their second joint golf outing of the season July 24 at Rolling Green Country Club. Some 100 members and guests of the two groups participated in the golf tournament, with more than 40 prizes being awarded to winning golfers. J. Ferguson, Plaskon Division, Libbey-Owens-Ford Glass Co., was the low gross winner. The committee in charge of arrangements was under the chairmanship of M. Meltzer, Service Plastics Co., and included Harry Hill, Celanese Corp. of America, and Gordon Labounty, Louis Fishman & Co.

The third and final joint golf outing was held on August 17 at the River Forest Country Club, with some 95 members and guests of both groups participating. Approximately 35 prizes were distributed to winning golfers, with Mr. Ferguson again taking low gross. The committee in charge again consisted of Meltzer, Hill, and Labounty,

Plastics Slogan Contest

CASH awards of $500, $200, and $100 are being offered for the most effective slogan submitted for the Fifth National Plastics Exposition. Sponsored by The Society of the Plastics Industry, Inc., the show will be held in Convention Hall, Philadelphia, Pa., March 11-14, 1952. Any person connected with the plastics industry, its suppliers, and its customers is eligible to compete in the contest, and entries must be postmarked not later than November 1.

The slogan contest was announced by P. H. Grunnagle, Westinghouse Electric Corp. and chairman of the exposition committee, who said, "We are seeking the memorable, significant slogan or theme which will wrap up in a single word or phrase the tremendous contributions which these man-made materials have already given or are destined to give to mankind."

Entry blanks which also explain the contest in detail are being circulated to 4,000 companies representing every branch of the plastics field. Judges for the contest are now being selected and will be announced shortly. Entry blanks may be secured from the Slogan Contest Committee, Fifth National Plastics Exposition, 67 W. 44th St., New York 18, N. Y.

New Plastics Plant

MONSANTO CHEMICAL CO., St. Louis, Mo., has purchased a 115-acre site and several buildings at Addyston, O., to serve as a midwest center for production and distribution of plastics.

The new plant, on the Ohio River and abutting the city limits of Cincinnati, will be operated as a unit of the plastics division. Headquarters for the division will remain in Springfield, Mass., with no curtailment of any of the local operations. With the establishment of a plant in Ohio,

(*Continued on page 720*)

Scientific and Technical Activities

Rubber Section Program

AS A part of the National Safety Congress, the Rubber Section, National Safety Council, will hold a two-day meeting at the Stevens Hotel, Chicago, Ill., October 9 and 10. George Burkhart, The General Tire & Rubber Co., vice chairman of the Rubber Section and in charge of the program, has announced the following speakers and other activities for the meeting.

TUESDAY AFTERNOON—OCTOBER 9

2:00 p.m. **Opening Remarks and Report on Section Activities.** Stanley A. Wright, Inland Mfg. Division, General Motors Corp., chairman of the Rubber Section.

2:10 p.m. **Rubber Section Statistics.** C. E. Frick, Van Cleefe Bros., Inc.

2:20 p.m. **"New Development in Rubber Reclaiming Safety."** A. J. M. Kerrigen, U. S. Rubber Reclaiming Co., and B. M. R. Batche, Xylos Rubber Co.

3:00 p.m. **"A Plant Manager Looks at His Safety Program."** R. V. Righter, Central Foundry Division, General Motors Corp.

WEDNESDAY AFTERNOON—OCTOBER 10

2:00 p.m. **Report of Nominating Committee.** R. A. Bullock, Corduroy Rubber Co.

2:15 p.m. **Safety in the Rubber Industry:**

A. **"Solvents."** W. J. Dooling, Hood Rubber Co.

B. **"Control of Chemicals in the Rubber Industry."** F. W. Sands, United States Rubber Co.

C. **"Control of Static Electricity."** J. L. Shifflett, Goodyear Tire & Rubber Co.

D. **"Conveyers and Blenders."** J. L. Dean, Firestone Tire & Rubber Co.

E. **"Power Trucks."** R. S. Farnum, United States Rubber Co.

3:30 p.m. **Safety Film Produced by Goodyear.** R. W. Fickes, Goodyear.

Additional Experimental GR-S Polymers and Latices

THE table below gives the additions and changes in the list of experimental GR-S polymers and latices authorized by the Office of Rubber Reserve, RFC, during the period from June 27 to July 30, 1951.

Normally, experimental polymers will be produced only at the request of the consumers, and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside, if possible, for distribution to other interested companies for their evaluation. The 20 bales, when available, will be distributed in quantities of one bale or two bales upon request to the Sales Division of Rubber Reserve, or will be held for six months after the experimental polymer was produced, unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received.

These new polymers are experimental only, and ORR does not make any representations or warranties of any kind, expressed or implied, as to the specifications or properties of such experimental polymers or the results to be obtained from their use.

X-NUMBER DESIGNATION	POLYMER DESCRIPTION
	Changes in Previously Announced Polymers
X-634 GR-S	Number cancelled.
Notes:	(1) In all 41° F. experimental solid polymers, sodium and potassium Rubber Reserve soaps are interchangeable on an equimolar basis.
	(2) For all low-temperature experimental polymer and latex formulations where rosin soap is the emulsifier, delete the trade name "Dresinate" and insert "Dehydrogenated (Disproportionated) Rosin Soap L. M. 2.19.0.1 or L. M. 2.19.0.3."
	New Polymers and Latices
X-651 GR-S	Same as X-579 masterbatch, except that Sterling SO replaces Philblack A.
X-652 GR-S	A masterbatch of 100 parts of GR-S-X-647 and 70 parts of EPC black. Stabilized with 1.25% BLE on the unpigmented polymer.
X-653 GR-S Latex	Polybutadiene latex polymerized by the Type V latex technique. Total solids, 55%.
X-654 GR-S	An oil-rubber masterbatch identical with X-628 GR-S, except that 25 parts of Shell SPX 97 are used in place of Circosol-2XH.
X-655 GR-S	Butadiene styrene charge ratio 75/25 adjusted to give 20±1% bound styrene; polymerized at 122° F.; emulsified with Rosin Soap L. M. 2.19.0.1 or L.M. 2.19.0.3; shortstopped with sodium dimethyl dithio carbamate alone, or with sulfur as sodium polysulfide; stabilized with 1.25% PBNA on the rubber. Mooney viscosity, 54±4.
X-656 GR-S	Same as X-608 masterbatch, except shortstopped with sodium dimethyl dithiocarbamate and Polyamine-H.

Group Outings

THE Buffalo Rubber Group held its annual summer outing July 20 at the Lancaster Country Club, Lancaster, N. Y., with some 85 members and guests attending. The program included an afternoon of golf, softball, horseshoes, baseball throwing, and egg throwing contests, followed by an evening of dinner with music and entertainment provided by magician Les Gilbert, Hercules Gasket & Rubber Co.

Prize winners in the golf tournament follow: low gross, Carl Croakman; high gross Dick Colden; most 6's, Charles Lavin; most 5's Bill Butler; and kickers' handicap, Herb Harris, John Kelly, and Mr. Lavin. Winners in the other contests were: horseshoes, Ed Martin, Hewitt-Robins, Inc., and Lorenz Barie, U. S. Rubber Reclaiming Co.; egg throw, Paul Sick, Hewitt-Robins, and Al Shor, R. T. Vanderbilt Co.; and baseball throw, Ray Lowry, Hewitt-Robins. The arrangements committee was headed by T. T. Mac Connell, U. S. Rubber Reclaiming, and included the following members: softball, Mr. Martin; egg throw, Charlie Johnson, Hewitt-Robins; horseshoes, Gene Cimminelli, U. S. Rubber Reclaiming; and baseball throw, Ed Knechtel, Hewitt-Robins.

Rain and Record Crowd

Despite bad weather, rain that began in mid-afternoon and increased steadily in intensity into the night, the New York Rubber Group golf outing on August 7 at the Baltusrol Golf Club, Springfield, N. J., attracted a record attendance of 195 members and guests, of whom 132 completed 18 holes. Possibly rubber and associated industry golfers shed water more readily than golfers from other walks of life.

J. Breckley, Titanium Pigment Corp., and his committee, consisting of C. O. Davidson, Binney & Smith Co.; G. H. Provost, United States Rubber Co.; W. S. Woodward, American Zinc Sales Co.; and K. J. Soule, Manhattan Rubber Division, Raybestos-Manhattan, Inc., deserve much credit for the success of this outing in view of the fact that they had so little cooperation from the weatherman.

Winners in the tournament included: *low gross, members*, F. F. Salamon, Binney & Smith; E. B. Curtis, R. T. Vanderbilt Co., Inc.; and Mr. Breckley; *low gross, guests*, V. Lake, C. E. Basilone, and G. A. Cella; *kickers handicap*, J. C. Vincent, E. R. Hansen; and ten players tied for third and fourth prizes, respectively. A prize for high score was awarded to S. R. Doner, Manhattan Rubber. The putting contest winners consisted of O. E. Anderson, J. F. Gilbert, A. C. McFadden, and A. R. Loosli.

Several prizes were awarded to players scoring a birdie, and a set of matched irons was won by lot by Dan Rice.

Big Day for Chicago Group

The largest and most successful golf outing in the history of the Chicago Rubber Group took place August 3 at the Medinah Country Club, Medinah, Ill. Some 190 members and guests competed in the golf tournament; while 300 persons were present at the dinner concluding the program. Golf and door prizes totaling a new record $2,500 in retail value were distributed after the dinner and were made possible by the contributions of over 155 rubber and supplier companies.

First prize winners in the golfing events were as follows: *low gross (members)*, Francis Frost, Frost Rubber Works; *low gross (guests)*, Elmer Hibbs; Peoria System *(members)*, G. Grupe, La Velle Rubber Co.; Peoria System *(guests)*, Jack Kaszyneski; *nearest to pin on ninth hole*, Herman Boxser, Acadia Synthetic Products Division, Western Felt Works; *longest drive*, John Rand, Inland Steel Container Corp.; *least putts*, Bruce Hubbard, Ideal Roller & Mfg. Co.; *kickers' handicap*, William A. Schmid, La Velle Rubber; *high gross (members)*, E. O. Jensen, Roth Rubber Co.; and *high gross (guests)*, E. Kann. J. Adams, Sears, Roebuck & Co., was chairman of the outing committee, and was assisted by John Groot, Dryden Rubber Division, Sheller Mfg. Co.; Bob Hartman, Monsanto Chemical Co.; Jim Knight, Roth Rubber; Al Laurence, Phillips Chemical Co.; Ed Meyer, Herron & Meyer; and Dwight Smith Cary Co.

Abrasion, Wear Symposium

THE Rubber-Stichting, Delft, Holland, has announced the final program for the International Symposium on Abrasion and Wear, to be held in the organization's new building on November 14 and 15. The program follows:

WEDNESDAY, NOVEMBER 14

10:00 a.m. **Opening of the Symposium,** R. Houwink, director general of Rubber-Stichting.

10:15 a.m. **Introductory Remarks.** H. C. J. de Decker, director of research, Rubber-Stichting.

10:30 a.m. **"The Friction of Solid Surfaces."** F. P. Bowden, Cambridge University, England.

11:30 a.m. **"Principles of Wear Prevention."** H. Blok, Royal Dutch Shell Laboratory, Thornton, England.

12:30 p.m. **Special luncheon** offered by Rubber-Stichting, followed by a demonstration of apparatus for measuring abrasion and wear.

3:00 p.m. **"Chemistry of Wear."** J. J. Broeze, Royal Dutch Shell Laboratory, Delft.

4:00 p.m. **"Morphological Aspects of Abrasion and Wear."** G. Salmon, Rubber-Stichting.

5:00 p.m. **End of first day's program.**

THURSDAY, NOVEMBER 15

10:00 a.m. **"Abrasion and Wear of Rubber."** J. M. Buist, Imperial Chemical Industries, Manchester, England.

11:00 a.m. **"Studies in the Abrasion of Rubber."** A. Schallamach, British Rubber Producers' Research Association, Welwyn Garden City, England.

12:00 noon. **Luncheon,** as on first day, and continuation of the demonstration.

2:00 p.m. **"The Abrasion Resistance of Paints."** N. A. Brunt, Paint Research Institute, Delft.

3:00 p.m. **"Some Factors Influencing the Road Wear of Tires."** R. D. Stiehler, National Bureau of Standards, Washington, D. C., U.S.A.

4:00 p.m. **"General Survey of the Symposium."** Dr. de Decker.

4:45 p.m. **Close of the Symposium.** Dr. Houwink.

The exhibition of abrasion apparatus will be open continuously during the Symposium. Some excursions, including sightseeing trips and visits to government and industrial laboratories, will be arranged for November 16 and 17. The maximum number of participants in the Symposium will be limited to 150, and persons wishing to attend must fill in application forms, obtainable from the secretary, and return them by September 30. The secretary is Dr. H. C. J. de Decker, Rubber-Stichting, Postbox 66, Delft, Holland.

Automotive Rubber Specifications Revised

THE SAE-ASTM Technical Committee on Automotive Rubber has released a 1951 revision of the Specifications for Rubber and Synthetic Rubber Compounds for Automotive and Aeronautical Applications (ASTM D 735-51T, and SAE Standard R 10). These specifications were first issued in 1943 and revised in 1946 and 1948.

In former versions an attempt was made to separate natural rubber and GR-S compounds. The new revision discontinues such separation, and rubber compounds are now divided into two basic types: Type R, those requiring no specific resistance to petroleum-base fluids; and Type S, those requiring specified degrees of resistance. Type R compounds are not further described as to classes of elastomers and may be prepared using natural, reclaim, synthetic, or mixtures of these rubbers, provided the requirements of the specification are met.

Type S compositions, nominally used where resistance to swelling action by oil is required, are subdivided into three classes, as follows: Class SA compounds having very low volume swell (normally made from polysulfide rubbers); Class SB compounds having low volume swell in petroleum hydrocarbons (normally made from acrylonitrile rubbers); and Class SC compounds having medium volume swell in petroleum hydrocarbons (normally made from neoprene rubber). The specifications further provide for different grades within each class, with grades designated by a number representing the hardness and tensile strength properties of the stock. In addition to combining classes RN and RS in the new Type R table, resistance to changes in hardness and tensile properties after oven aging has been added as a basic requirement. New values for compression set have also been established which require the development of low-set compounds. In the Type S tables, changes in volume swell, tensile, elongation, and hardness after air oven aging have been made, and compression set requirements added.

A practical addition to the revised specifications is a key chart with examples illustrating the use of the specifications in selecting a particular type, class, or grade of rubber compound. Copies of the revised specifications, including the insert key chart, can be purchased from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., at a price of 40¢ each. Separate copies of the key chart are 10¢ each.

CALENDAR

Sept.	20.	Southern Ohio Rubber Group, Engineer's Club, Dayton, O.
Sept.	28.	Symposium, "Modern Rubber Testing." Institution of the Rubber Industry, London, England. Chicago Rubber Group.
Sept. 30- Oct.	3.	Controllers Institute. Annual Meeting. Waldorf Astoria Hotel, New York, N. Y.
Oct.	1-5.	International Standards Organization—Technical Committee 45 on Rubber, Oxford, England.
Oct.	2.	The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.
Oct.	5.	Detroit Rubber & Plastics Group, Inc. Detroit Leland Hotel, Detroit, Mich.
Oct.	8-12.	National Hardware Show, Grand Central Palace, New York, N. Y. Thirty-Ninth National Safety Congress and Exposition, Chicago, Ill.
Oct.	10.	Newark Section, SPE. Military Park Hotel, Newark, N. J. Chicago Section, SPE; Midwest Chapter, SPI. Builder's Club, Chicago, Ill.
Oct.	10-11.	SPI New England Section. Equinox House, Manchester, Vt.
Oct.	17.	New York Section, SPE. Hotel Gotham, New York, N. Y.
Oct.	18.	SPI-SPE Joint Dinner-Meeting. Toronto Chapter. St. Regis Hotel, Toronto, Ont., Canada.
Oct.	19.	Akron Rubber Group. Boston Rubber Group.
Oct.	21-27.	Cleaner Air Week in the United States and Canada.
Oct.	22-24.	Packaging Institute. Annual Forum. Hotel Commodore, New York, N. Y.
Oct.	23.	Buffalo Rubber Group, Hotel Westbrook, Buffalo, N. Y. Association of Consulting Chemists & Chemical Engineers. Annual Meeting. Hotel Shelburne, New York, N. Y. Washington Rubber Group. Annual Banquet and Installation of Officers. Washington National Airport Terrace Dining Room.
Oct.	26.	New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
Nov.	2.	Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.
Nov.	9.	Chicago Rubber Group.
Nov.	11-13.	Western Sporting Goods Dealers Assn. Convention and Show. Hotel Biltmore, Los Angeles, Calif.
Nov.	14.	Chicago Section, SPE; Midwest Chapter, SPI. Builder's Club, Chicago, Ill. Newark Section, SPE. Military Park Hotel, Newark, N. J.
Nov.	14-15.	International Symposium on Abrasion and Wear. Rubber Stichting, Delft, Netherlands.
Nov.	21.	New York Section, SPE. Hotel Gotham, New York, N. Y.
Nov. 25- Dec.	1.	International Congress of Industrial Chemistry. Paris, France.
Nov. 26- Dec.	1.	Chemical Industries Exposition. Grand Central Palace, New York, N. Y.
Dec.	2-5.	American Institute of Chemical Engineers. Annual Meeting. Chalfonte-Haddon Hall, Atlantic City, N. J.
Dec.	13.	Manufacturing Chemists Assn. Semi-Annual Meeting. Waldorf-Astoria Hotel, New York, N. Y.

Geer Laboratory Established

THE establishment of the William C. Geer Laboratory of Rubber and Plastics has been announced by Cornell University, Ithaca, N. Y. The unit is named for Dr. Geer who gave equipment from his private laboratory, funds for additional apparatus, and a valuable library on rubber toward the project. The Laboratory has been formed in the University's School of Chemical and Metallurgical Engineering and will be directed by Prof. C. C. Winding, a specialist in rubber and plastic chemistry.

Research is expected to concentrate largely on problems of synthetic rubbers. In addition to its use by members of the school staff, the Laboratory will be used for group research projects required of all students in the final year of the curriculum. The Laboratory is also expected to be used ultimately for some advanced laboratory courses for graduate students. The equipment given by Dr. Geer forms a complete unit for producing, vulcanizing, and testing rubbers.

NEWS of the MONTH

National Rubber Policy Studies Begun Again; OPS Suspends Tailored Price Ceilings Indefinitely

With the views of the Administration on synthetic rubber plant disposal due to be submitted to Congress by January 15, 1952, consideration of our national policy on rubber is again an active subject of discussion by government agencies and the industry. It appears that the present situation on relaxation of government controls on the industry is one in which any progress is dependent upon the lowering of the natural rubber stockpile objective of Munitions Board Chairman John D. Small, who has regularly ignored all recommendations in this connection.

John L. Collyer, president, The B. F. Goodrich Co., recommended during August that the President appoint a Special Commission "of the character of the Baruch Committee" to study the problem of the completely "socialized" rubber industry and develop a policy of competition in that industry "in keeping with the traditions and principles underlying both our domestic and foreign policies."

As a result of the passage of the new Defense Production Act, and more particularly because of the Capehart amendment to that Act, the Office of Price Stabilization suspended "indefinitely" manufacturers Ceiling Price Regulation 22 under which rubber products were to be priced. A recalculation of industry-wide percentage cost adjustment factors is necessary, and interpretation of the new Act will require some time. Rubber products generally will remain under the General Ceiling Price Regulation.

The Office of Rubber Reserve, Reconstruction Finance Corp., is converting 75% of its GR-S producing capacity to cold GR-S rubber and increasing the output of cold GR-S latex to 35,000 tons a year. An increase in butyl rubber capacity, possibly to be owned and operated by private interests, is also being considered.

A sixth round of wage increases has been granted many rubber workers as a result of new agreements reached in August between the United Rubber Workers, CIO, and United States Rubber Co., Firestone Tire & Rubber Co., Goodrich, Seiberling Rubber Co., General Tire & Rubber Co., Mohawk Rubber Co., and American Hard Rubber Co. The increase amounted to 13¢ an hour in most cases.

Washington Report

By

ARTHUR J. KRAFT

Rubber Policy Studies

The Administration's rubber policy agencies are expected soon to start moving on the job of drawing up synthetic rubber plant disposal recommendations for submission to Congress next January.

President Truman during August instructed Jack Gorrie, Acting Administrator of the National Security Resources Board, to gather their views as the basis for presidential recommendations. The Rubber Act of 1948, as extended, requires NSRB to report administration views on plant disposal to Congress by January 15, 1952. The Act expires on June 30, 1952.

A similar study was made under the Rubber Act of 1948 by a 13-agency committee and transmitted to Congress as the so-called "Steelman Report" in January, 1950. The culmination of five months' work, the recommendations of this report were rejected when Congress voted a flat two-year extension of the existing law.

The Steelman Report called for a 10-year controls program—providing a flexible controls system coupled with authority to sell or lease government synthetic rubber plants to private interests. The present law prohibits disposal either through sale or lease, requires maintenance of at least 660,000 tons of synthetic capacity and consumption of 220,000 tons annually.

Gorrie's plans for organizing the new study have not yet been announced.

The Stockpile Situation

The efforts of several defense agencies and industry to put the government's natural rubber stockpile program on a more realistic basis has been bogged down in the Munitions Board for more than two months.

The reason, apparently, is that the Board is unwilling to accept the conclusion of other defense agencies or the industry that the stockpile target should be trimmed by a sizable amount. Not that the Board has, at this writing, (August 22), rejected this position. It simply has delayed making a decision or providing its views so that the decision might be made elsewhere.

The task of evaluating the post-Korea stockpiling objective was undertaken last fall by the National Production Authority. Industry technicians, operating as subcommittee task groups to NPA, were set to work to advise on the specifications now required of military rubber goods to assure satisfactory performance.

This work, completed in April, indicated that a good deal less natural rubber was needed in military items than previously contemplated. Since the stockpile objective is a composite of the quantity of natural rubber needed in a military item times the number of items needed for a five-year war, it is evident that the lowering of either element would mean a lower stockpile requirement.

The Munitions Board early in May was asked for its views on these new calculations. It was advised that the calculations indicated a stockpile requirement somewhat under what the Board was then aiming at. There was no response to this request or to subsequent requests.

The Board's current target, if stockpile accumulation moves at a good rate, should be attained in the Summer or Fall of 1952, it is generally assumed. What it has been asked to consider is a lower target, which, at the same rate of accumulation, could be attained next spring.

No one in a responsible position in government has adopted the industry's contention that the amount of rubber now in the stockpile is adequate and that further additions should not be made.

The dispute underlying the rubber stockpile objective seems to revolve about the following points:

1. The position expounded by some in the industry that the rubber now in the stockpile is adequate to meet requirements in a five-year war, assuming that all the tight restrictions imposed on the motoring public in the last war were reimposed at the outbreak of another major war.

2. The position privately held by Munitions Board Chairman Small that the assumptions underlying the present stockpile objective are too optimistic. In other words we must be prepared for a war of longer duration and one in which we must supply much more of the military rubber equipment needed by our allies than contemplated under the estimates so far advanced.

3. The position advanced by other defense agencies that the present assumption, which includes supplying some equipment to NATO allies in a five-year war, are correct, and that the specifications should be lowered in line with developments in synthetic rubber technology made since the current set of specifications were adopted four years ago.

This last group does not deny industry's contention that we could get along with our current stockpile, but it does propose that, while we have time, we should build a stockpile adequate to see us through a war without imposing *all* the tough restrictions imposed in the last war. Such a stockpile could be attained—or substantially attained—next spring.

With this dispute in the background, stockpiling activity is apparently no longer dictated by the same sense of urgency that motivated it in the year since Korea. GSA has not been very active in the market during the past two months; rather it is keying its activity—and propaganda—to getting the price down further.

Rubber from Thailand

Thailand has assured the United States of 125,000 tons of natural rubber to be made available in the 18 months from July 1, 1951, through December 31, 1952, under an agreement signed in Bangkok on August 17 by United States Charge d'Affaires, William T. Turner, and Commerce Minister Phra Boriphand.

A fairly obvious effort to bolster the Thailand Government's hand in rejecting possible pressure for heavier rubber shipments to the Soviet Union, the agreement provides only that Thailand will make 125,000 tons of rubber available to the United States and that the United States Government or private U. S. trade channels will purchase that quantity.

Purchase price will be the Singapore market price at time of purchase. The agreement is not a contract. Purchases will be made through private channels in Thailand, not through the Thai Government.

The General Services Agency has already entered into an agreement with the Indonesian Government, under which In-

donesia agreed to sell the rubber produced on the small estates owned by that government. These estates produce about 1,200 tons of rubber a month. Shipments were to begin in September, 1951, and the price would be the average Singapore market price for the previous month. Indonesia has indicated recently, however, that because of the drop in rubber prices, it would like to cancel the agreement. Whether that government has formally asked for cancellation has not been disclosed.

RFC Activities

ORR is embarking on a major "switch" from hot to cold GR-S synthetic rubbers. Agency officials confirmed definitely its intentions to move ahead with a conversion program in which 75% of the 860,000-ton projected output would be cold rubber.

Also definitely planned is a major step-up in output of GR-S latex, with heavy emphasis on cold rubber types. The current annual production rate of some 30,000 long tons, dry weight, which includes several thousand tons of cold rubber GR-S latex, will be increased to an annual rate exceeding 50,000 tons. Of this 50,000 plus tons, less than 20,000 tons will be hot GR-S latex, and the balance—some 35,000 tons—will be cold GR-S latex.

Manufacturers of foamed rubber goods—including bedding products—are reported enthusiastic over the results obtained in using cold GR-S latices produced by Rubber Reserve over the past few months. The material is reported the equal of natural rubber latex in commercial applicability. The odor problem does not exist with cold rubber latex, and other disadvantages of hot GR-S latex also have been overcome, it was said. It could not be ascertained whether products made with cold rubber latex have as yet reached retail distribution outlets.

The latex conversion program is expected to be completed within a year, with a fair part of the conversions being made in the next few months.

While Rubber Reserve's plans for boosting GR-S output to 860,000 tons a year are set, a further expansion does not appear likely in the near future. The subject was reviewed by Administrator W. Stuart Symington, of RFC, with his Rubber Industry Advisory Committee at meetings held July 31 and August 14. The industry leaders, it was said, expressed the view that further expansion will not be needed in the immediate future. The subject, however, is one for continuous review at the bi-weekly meetings of this group with Symington.

Symington and his industry advisers are reported agreed that the chief impediment to private industry entering the synthetic rubber industry as producers of GR-S is the government's policy of selling the material at cost. Thus far the industry has been content apparently to have this policy maintained, but further study of possible methods of encouraging private investment in GR-S production can be expected.

Keener interest was expressed in the recent meetings with Symington in construction of additional butyl rubber production capacity. Several companies are looking into the prospects of building a butyl plant to be owned and operated by private interests. Whether another plant will be built, and whether it will be a private or government plant, is still undecided. RFC's present butyl capacity is 80,000 tons annually. The talk thus far envisions construction of no more than one additional plant.

The industry feels confident that butyl rubber for inner tubes is on firmer ground than GR-S as a price competitor with natural rubber and is reportedly confident that additional uses for butyl will be found, further assuring a firm market. RFC's selling price for butyl is 20.75¢ a pound.

The industry committee also discussed with Symington and his chief production aides the possibility of replacing current alcohol butadiene production with petroleum butadiene as a cost-saving measure. About one-fourth of the butadiene going into GR-S is alcohol butadiene.

ORR is still increasing production of GR-S oil masterbatch rubbers in response to growing industry demands for these materials. Requests have been pouring in for an increasing variety of X-numbers of oil masterbatch rubbers. Tests indicate, according to RFC, that the quality of oil masterbatch rubbers as tire tread stock is on a par with cold rubber GR-S. Most of the material is being made by Goodyear at Houston, Texas. General Tire is making a cold rubber masterbatch at Baytown, Tex.

Symington also disclosed during August that his rubber industry advisers and he are developing a plan for disposing of the government's synthetic rubber plants to private industry. He said he feels the industry wants disposal, and he favors it also. Whether disposal could be accomplished in the current emergency, however is up to Congress, it was pointed out.

Symington told a press conference on August 21 that he hopes to have the plan ready "as soon as possible," but noted that the complex issues involved cannot be resolved, even on paper, overnight. It was added that when the plan was developed it would be brought to the attention of other agencies.

The synthetic rubber plants probably cannot be sold piecemeal, the RFC head said. A disposal plan should provide for selling feedstock plants along with copolymer facilities, since to do otherwise would leave the government in control of the industry's raw material.

Among the issues which must be resolved in a disposal plan are provisions guarding against development of a monopoly structure in synthetic rubber, giving small companies and latecomers to the government program an "equal opportunity" with the larger, current operators to buy plants, and determination of a selling price which will permit purchasers to operate at a profit and yet assure the taxpayer a fair price for the $700 million or more of public funds used to construct the plants.

Symington expressed confidence that synthetic rubber will be able to compete fully pricewise with natural rubber and said GR-S already is the equal in performance to natural rubber in almost all uses, while butyl rubber is clearly preferable for inner tubes to natural rubber.

Reliance on alcohol butadiene facilities for the projected expansion to 860,000 tons of GR-S a year—which he said will be completed some time in 1952—will probably mean a price increase. He saw reductions later, however, as oil-extended rubber comes into wider use.

M-2 Revision

NPA put before the Rubber Industry Advisory Committee on August 29 a revised M-2 Order, effective September 1, making the following changes:

1. Terminated controls on consumption of natural rubber latex. The restriction eliminated held each manufacturer's quarterly use to his average quarterly use, as adjusted by NPA, in the base period, the year ended June 30, 1950. The order also had made provision for extra allotments of available latex not needed by GSA.

2. Simplified the provision of the order for replacing rubber used in filling military orders (Section 6 of the July 17 amendment).

3. Relaxed inventory restriction on natural rubber by dropping the ban on acquiring more natural rubber during a month than the manufacturer is permitted to use in that month. However the 60-day supply inventory limit was not changed.

4. Increased the maximum inventory of GR-S allowed to be carried by a manufacturer from 20 to 30 days' supply.

5. Eliminated the inventory limitation on tires and tubes at all stages of distribution. The limitations had been 30 days except for passenger-car tires and tubes, where it was 15 days' supply.

6. Dropped the special provision requiring manufacturers who produced camelback during the base period to maintain a monthly output of at least 150% of the base period. The same rate of production, however, was required by requiring manufacturers who made camelback in the second quarter of 1951 to maintain that rate in subsequent months. The second-quarter rate was equal to 150% of the base period rate.

It was indicated at the August 29 meeting that sufficient new rubber will be made available to industry in 1952 to maintain the record consumption authorized in the third and fourth quarters of this year.

Carbon Black Outlook

At a meeting with its carbon black industry advisory committee on August 22, NPA assured producers that sufficient steel would be allocated to construct by mid-1952 the 110 additional hopper freight cars which the industry has requested. Already 95 cars have been placed on order by carbon black producers.

The committee asked NPA to intercede with the Office of International Trade to have the latter eliminate from its export licenses the grades and quantity of carbon black authorized for export to a particular overseas buyer. Since some grades are in short supply here, this practice results in disruption of the delivery pattern for domestic consumers, the committee explained.

NPA estimated that domestic production capacity at the end of 1951 will amount to 1,691,000,000 pounds and, on the basis of current expansion plans, will rise to 2,215,000,000 pounds by the end of next year. It estimated consumption, including exports, at 1,690,000,000 pounds this year and at 1,850,000,000 in 1952.

The industry said it feels confident that exports can be increased substantially since they currently represent only the excess supply not required by domestic consumers. Also, it pointed out, several foreign countries are expanding production of rubber goods or are now getting into rubber goods production, creating new markets for carbon black.

OPS Actions

OPS on August 9 indefinitely postponed its six basic manufacturing price regulations, including Ceiling Price Regulation 22—the General Manufacturers Price Regulation under which rubber products were to be priced.

Final effective date of this order was to have been August 13. The postponement

was ordered to give the agency time to issue procedural regulations applying the so-called Capehart amendment to the basic manufacturing orders. The August 9 action did no more than "preserve the status quo."

Since the Capehart amendment allows manufacturers more liberal treatment of their post-Korea costs in determining ceiling prices, many companies protested against the agency's plan to make the manufacturing orders effective August 13. Such agency action would have meant filing under CPR *22* on August 13 only to repeat the entire procedure after the Capehart amendment's application was clarified.

The August 9 order deferred both compulsory filing and reporting and compulsory pricing under CPR *22* and the other manufacturing orders. Manufacturers who had already put CPR *22* into effect by selling under its provisions had to continue doing so. Any manufacturer who found himself in a price squeeze could put CPR *22* into effect for himself immediately to take advantage of price ceiling increases. If he elected to do this, however, he also had to take the price rollbacks called for under CPR *22* computations.

The immediate impact of the August 9 postponement on the rubber industry was confined to manufacturers of 112 categories and product lines of rubber products listed in Amendment 1 to Supplementary Regulation 8 of CPR *22*, issued July 30, to take effect August 13. Major product categories listed in this July 30 amendment were bare rubber thread, friction tape, V-belts, flat rubber belting, hose, tank linings and roll coverings, hard rubber products, latex foam sponge, chemically blown sponge, mats and matting, hydraulic brake cups and parts and boots, typewriter platens and rolls, industrial and agricultural tires, graphic arts products, and camelback and tire and tube repair materials. Also affected were those who made the 15 categories already appearing in SR 8 to CPR *22*, who had not applied the industry-wide percentage cost adjustment factors prior to August 13.

SR 8, a the time of postponment, included industry-wide percentage cost adjustment factors for 127 categories and lines of rubber products which manufacturers were to apply to their own appropriate base period (pre-Korea) prices in determining their ceilings. How these will be affected by the Capehart amendment will be known eventually.

The Capehart amendment, which became effective late in the day of July 31, prohibited OPS from issusing price regulations rolling back prices or setting ceilings below prices prevailing from January 25 through February 24, 1951. This prohibition, however applies to regulations issued after the Capehart amendment was enacted and therefore excludes the factors set forth in SR 8, as amended.

Under the Capehart amendment OPS can issue price orders fixing ceiling that take into account the cost increases or decreases from the highest price prevailing in the January 1, 1950, through June 24, 1950, period to July 26, 1951. Also under the Capehart amendment OPS can set or *maintain* ceilings at the highest level prevailing from January 1, 1950, to the time of the Korea incident, but they must take account of cost increases or decreases from that level to July 26, 1951. Excepted are ceilings set under a regulation issued before the Capehart amendment was enacted.

Another provision of the Capehart amendment, however, might require the President to adjust ceilings, on individual application, to allow adjustments for cost increases (or decreases) sustained to July 26, 1951. OPS is wrestling with this one.

The cost adjustment factors listed in Amendment 1 to SR 8 result in ceiling price increases for 42 categories or product lines, rollbacks for 57, while 13 remain unchanged from existing ceilings under the GCPR of January 26, under which most of the industry has been pricing.

If a company makes only chemically blown sponge, where all eight product lines are eligible for price ceiling increases, it would be to its obvious advantage to apply CPR *22* without waiting for OPS to end the "indefinite postponement" of the compulsory application of the order. A company making rubber hose, however, would be faced with taking rollbacks on any of the 15 product lines for which the factors spell out rollbacks if it elected to take price increases allowed for the eight other product lines of hose.

Most of the categories of rubber products listed include rollbacks as well as price increases, although some provide rollbacks only and others roll-forwards only. A large company, with a diversified line of products, would certainly be faced with a number of rollbacks if it elected to apply CPR *22* to take advantage of a roll-forward on one or more items.

The Mechanical Goods Rubber Industry Advisory committee to OPS recommended on August 14 that its branch of the industry be permitted by amendment the option of applying CPR *22* category by category. The committee wanted an out from the requirement that if it used this order to take advantage of a price increase, it also would have to take rollbacks.

Because of the mixed rollbacks and roll-forwards in most categories, long-line companies planned, they said, to stick with their GCPR ceilings until the situation is clarified. The committee's appeal was on behalf of single-line companies in "squeeze" categories. They could take advantage of roll-forwards only at the risk of being price cut by competing firms maintaining their old price.

If CPR *22* could be applied by categories, instead of being made an "all or nothing" proposition, the long-line concerns would also take advantage of ceiling price increases in "squeeze" categories, so no one would be hurt.

That was the argument put up by the industry committee. It also asked OPS for a clarifying ruling on whether a manufacturer now under the GCPR could sell at below his GCPR ceiling and at the same level as his CPR *22* ceiling without putting CPR *22* generally into effect. This situation arose in connection with ceiling prices on rubber hose, for which mixed rollbacks and roll-forwards are provided under SR 8.

Large manufacturers of molded, extruded, and lathe-cut rubber goods said they prefer to price under CPR *22*, but the smaller companies favored remaining under the GCPR ceiling, stating they doubt that competition will allow them to take advantage of roll-forwards. OPS is working on a tailored regulation providing a more practical formula than is provided by CPR *22* for pricing such items made to specifications and sold on a bid basis.

The effect of the Capehart amendment on tire and tube ceilings will yet have to be determined. Manufacturers' ceilings for tires and tubes were pulled out of CPR *22* on June 29 by SR 10 to that order. They are still under the GCPR and will remain so until OPS decides whether to allow 5% ceiling price increases resulting from higher costs since Korea, or whether such increases should be cancelled out by the reduction in the price of natural rubber put into effect July 1 by the General Services Administration.

It would appear that the Capehart amendment prohibits a rollback from existing tire and tube price ceilings, since these are the same as those obtained in the January 25 to February 25, 1951, period—the floor set by the Capehart edict.

On the other hand the present ceilings for tires and tubes are higher than pre-Korean prices. Capehart only requires that new ceilings allow cost increases over the highest prices existing before Korea. Price increases have taken care of some of the post-Korea cost advances, and the balance appear wiped out by the natural rubber price cut.

The 5% advance figured out under CPR *22* (before SR 10 froze tires and tubes under GCPR) included some anticipated labor cost increases. Whether they included the recent round of wage increases is not known. If not, these might be the subject of separate appeals for price relief.

Unaffected by the Capehart amendment, which applies only to manufacturers and processors of industrial materials, were the following OPS actions concerning the rubber industry:

General Overriding Regulation 2, Amendment 1, effective July 31. Exempts from price control certain materials and services used in making synthetic rubber by ORR. This amendment stipulates that prices determined by cost-plus-fixed-fee or other contracts either executed or *in process of negotiation* by Rubber Reserve before or during the December 19, 1950, to January 25, 1951, period are the ceiling prices for sales to Office of Rubber Reserve.

GCPR, SR 49, effective August 6. This regulation sets ceilings on used passenger-car tire carcasses at $3.50 retail and $2.60 wholesale. Sellers of recapped and rethreaded tires will determine their ceilings by adding to the ceilings for tire carcasses their indivdual ceilings for recapping and retreading services as determined under the services regulation, CPR, 34.

CRP 64, effective August 6. Ceiling prices for tire mileage service, usually supplied by tire manufacturers to bus and taxicab operators based on a price per tire mile, are covered in this order. Ceilings are to be set by reference to contracts in effect from last December 19 through January 25, 1951, but must be adjusted to reflect subsequent increases or decreases in the cost of rayon and cotton as well as rubber.

CPR 62, effective August 1. This regulation provides that manufacturers of private-brand tires and tubes determine their ceilings on the basis of manufacturing costs plus the percentage markup the manufacturer had on sales to a particular buyer during a 90-day accounting period between January 1 and June 30, 1950. This action removed private-brand sales out of the GCPR which froze margins to abnormally low levels generally prevailing in the December 19, 1950, to January 25, 1951, period.

CPR 58, effective August 6. This order spells out dollars-and-cents ceilings on 14 major grades of reclaimed rubber and provides means for pricing other grades of reclaimed rubber, custom reclaiming, masterbatching, and custom masterbatching. Ceilings are lower for California in line with the lower scrap rubber market there. The ceilings for whole tire reclaim are the same as those under GCPR, but are considerably lower for natural rubber tube and light-colored carcass reclaim.

CPR 59, effective August 6. This regulation sets dollars-and-cents ceilings on

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ABRASION

• A COLUMBIAN COLLOID •

COLUMBIAN CARBON CO. • BINNEY & SMITH CO.

Manufacturer Distributor

MPC (Medium Processing Channel)

STANDARD MICRONEX

◆

EPC (Easy Processing Channel)

MICRONEX W-6

◆

HAF (High Abrasion Furnace)

STATEX-R

◆

FF (Fine Furnace)

STATEX-B

◆

FEF (Fast Extruding Furnace)

STATEX-M

◆

HMF (High Modulus Furnace)

STATEX-93

◆

SRF (Semi-Reinforcing Furnace)

FURNEX

◆

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

scrap tires, tire parts, and scrap tubes and sets ceilings for other kinds of scrap rubber for each seller on the basis of his selling price between November 15 and December 31, 1950. The ceilings represent a rollback from GCPR ceilings. For scrap tires, tire parts, and scrap tubes they reflect the market prices existing at the time of the order (the market was under the ceiling level). Ceilings for scrap tires, tire parts, and scrap tubes apply to sales to wholesale scrap dealers, to consumers, and to export and import sales. Ceilings for other kinds of scrap do not apply to sales to wholesale scrap dealers. The ceilings are based on delivered prices at chief consuming centers and provide customary price differentials between these centers, reflecting those differentials in effect before Korea. CPR 59 permitted dealers, under certain circumstances, to clear out old inventories at above-ceiling prices if they put the materials in transit by August 13. Amendment 1 to CPR 59, effective August 13, extended this delivery deadline to August 23 because delays in distributing the regulation prevented the trade from learning details in time to get rid of higher priced inventories without incurring a loss.

Tire Industry Profits

The tire manufacturing industry racked up higher profit rates in 1950 than it recorded in 1949 and in 1940, according to a report on profit rates of 25 major manufacturing industries, submitted to Congress by the Federal Trade Commission on August 13.

"An outstanding characteristic of the industries studied," the Commission found, "is the continuation into the postwar period of the relationship which existed between the largest and the smaller companies during the prewar period. If the large corporations were more profitable than the smaller firms in the prewar period, they continued to be more profitable in the postwar period; and if the reverse was true in the prewar period, it continued to be true in the latter period."

Fifteen tire and tube manufacturing firms were studied, including Goodyear, Firestone, U. S. Rubber, Goodrich and 11 "medium size" firms. Rate of return for the 15 was 17.1% in 1950. For the four largest it was 17.2%, and for the 11 others it was 16.5%.

The comparative record shows that in 1940 the Big Four had an average stockholders' investment of $426,030,000, net income after taxes of $38,914,000, and a rate of return of 9.1%. The comparable figures for the other 11 firms were $40,631,000, $3,451,000, and 8.5%.

The same pattern continued in the postwar years 1947 through 1950, with the four largest last year having an average stockholders' investment of $908,183,000, net income after taxes of $156,601,000 for a rate of return of 17.2%. The 11 smaller firms had an average investment in 1950 of $173,879,000, net income of $28,696,000, and a rate of return of 16.5%.

Only in 1947 did the 11 smaller firms have a higher average rate of return than the Big Four, with the former recording a return of 15.5%, and the latter, 15.3%. In 1949 the four largest had a profit rate of 10.3%, while the 11 others slumped to 2.5%.

It is of interest to note also that returns for 28 manufacturers of industrial chemicals, including the four largest firms, were 14.4% in 1940, 17.1% in 1947, 18.6% in 1948, 18.4% in 1949, and 23.7% in 1950.

All returns reported were after deduction for taxes.

Other Industry News

Collyer on Rubber Policy

Collyer of Goodrich recommended last month that President Truman appoint a Special Commission "of the character of the Baruch Committee" to study the problem of the completely "socialized" rubber industry and develop a policy of competition in that industry "in keeping with the traditions and principles underlying both our domestic and foreign policies."

In making recommendations to the government, Collyer urged that "at the end of the present emergency the government take steps to 'desocialize' this major industry by selling or leasing to private industry the American rubber plants it now owns. The present Rubber Act became law on April, 1948, and will expire June 30, 1952.

"As a result of two wars in ten years," he said, "the rubber products manufacturing industry now finds itself in a unique position among major industries.

"Government owns the rubber producing plants, procures the raw materials and schedules production, is the only buyer and importer of crude natural rubber determines the amounts of rubber that may be consumed by manufacturers, sets the specifications for the use of rubber, and determines the price.

"Socialization of rubber has been tolerated by the American people only because it was dictated by military security and not by clearly defined policy.

"Today the goals of accumulating a stockpile of crude natural rubber adequate to meet the nation's military and essential civilian requirements for a five-year war, and the reactiviation of our man-made rubber industry capable of producing more than a million tons of rubber a year, have been achieved."

Collyer then recommended that government establish a timetable for accomplishing the following:

1. Termination of government control of crude natural rubber purchasing.

2. Termination of government control over consumption of rubber for civilian purposes.

3. Accumulation of a stockpile of 200,000 long tons of American-made synthetic rubber for the purpose of military security.

4. Limitation of active government participation in the field of rubber to the maintenance of strategic stockpiles after accumulation of the stockpile of man-made synthetic rubber has been accomplished.

5. A clear-cut statement of policy to be issued by government assuring both producers and consumers of rubber that the strategic stockpiles of crude and man-made synthetic rubbers will be employed only for the purpose of military and essential civilian security and will, under no circumstances, be used to manipulate rubber prices.

"Competition between natural and synthetic rubbers at home and abroad is a natural and desirable consequence of private ownership of synthetic rubber-producing facilities. This competition will benefit not only rubber consumers the world over, but also rubber producers."

Collyer also urged that the United States refuse to participate in any international rubber cartel and vigorously oppose the formation of such a cartel by rubber-producing and rubber-consuming nations.

He declared, however, that the United States should encourage worldwide interest in the development of more efficient methods for the production of crude natural rubber and means for increasing its usefulness.

RMA Activities

In a bulletin during August, The Rubber Manufacturers Association Inc., called to the attention of rubber goods manufacturers and their purchasing agents the latest developments in the field of technically classified rubber now being produced to the extent of about 20,000 long tons in 1951, of which about 4,000 tons are likely to be available to the United States. News Sheets Nos. 1 and 2 and Users' Information Circular No. 1, of the International Rubber Research Board, London, England, were distributed with the RMA bulletin.

The RMA, through W. J. Sears, vice president, is acting as a contact point for transmitting evaluation information on technically classified rubbers back to the I.R.R.B. with the thought that this development, which has been described at some length in previous issues of India Rubber World, may prove of benefit to all rubber consumers in the U.S.A.

Arrangements have recently been completed with the Emergency Procurement Service of GSA, the exclusive importer of natural rubber into the United States, to identify and hold all deliveries of technically classified rubber so that they may be sold to industry for consumption. Manufacturers who are interested in acquiring any of the Technically Classified Rubber may purchase it directly from GSA as No. 1 RSS. Manufacturers will be notified as soon as quantities are available for distribution.

The RMA made the point that if there is to be benefit to industry from this development, it is believed that the more information made available to the I.R.R.B. by consumers, the more quickly the value may be proved. Therefore manufacturers who subsequently purchase this material should evaluate it to the extent practicable, and the results of such evaluation should be forwarded to R. G. Newton, coordinating officer, International Rubber Research Board, 19 Fenchurch St., London, E.C.3, England, or it may be forwarded to W. J. Sears, vice president, Rubber Manufacturers Association, 1832 M. Street, N.W., Washington 6, D. C., for transmission to the International Rubber Research Board.

C. P. McFadden, chairman, rubber footwear division, RMA, in a statement before the House Ways and Means Committee during August, petitioned that committee to retain as an integral part of the Customs Law the so-called American Selling Price Principle" of computing duty on certain imports, since it was fundamental to the stability and well-being of the rubber footwear industry and its 20,000 production employes.

The "American Selling Price Principle" was invoked by President Hoover to protect the domestic rubber footwear industry from the economic impact of a flood of rubber footwear dumped in this country during the early Thirties by manufacturers in Japan and Czechoslovakia. Invocation of this formula averted collapse of the footwear industry in this country, and because of its fairness and effectiveness this principle was later reaffirmed by President Franklin D. Roosevelt.

Section 14 of H.R. 1535 would scuttle the formula for computing duty on imported rubber footwear and certain other products. The Rubber Manufacturers Association voiced vigorous objection to that section and Section 13.

EAST

Labor News

Wage and/or working conditions contract negotiations were very much in the forefront in the rubber industry during August. The first settlement was that between U. S. Rubber and the United Rubber Workers of America, CIO and consisted of a working conditions agreement and a wage increase of 12¢ an hour, with an additional 1¢ an hour night-shift bonus. Firestone next agreed to a similar 12¢ an hour increase plus a 1¢ an hour "supplementary increase." Goodrich followed within a few days by signing with the URWA on the same basis of 12¢-an-hour general increase plus 1¢ an hour "as a supplement to the general increase." Seiberling Rubber at about the same time announced that it had agreed to a 13¢-an-hour increase for its URWA employes and had also signed a new working conditions contract granting a full union shop and increased vacation benefits and other contract improvements.

Goodyear and the URWA have been delayed in negotiating the matter of wages because of the necessity of first obtaining approval of the local unions to the overall working conditions contract signed March 30. Early in August the Goodyear Akron local union approved its supplementary contract, and wage negotiations were expected to start the latter part of August. Many other companies in the industry were also negotiating with the URWA on the matter of the sixth round of wage increases.

These sixth-round wage increases require approval of the Wage Stabilization Board in Washington for about 8¢ an hour of the total. According to the WSB's 10% formula, the wage increases granted in 1950 amounted to between 7% and 8%, and an increase of from 2% to 3% was all that could be granted. The union will base its argument for approval of the additional amount on the new policy of the WSB of granting wage increases to employes without escalator clauses in their contracts in order that they may catch up with the rising cost of living and the claim that URWA workers should be allowed "productivity" increases.

When and if finally approved, these sixth-round wage increases will raise the hourly rate of all rubber industry workers to about $1.88 an hour. The rate of workers in the tire and tube branch of the industry will average slightly above $2 an hour.

Announcement that Mohawk Rubber, General Tire, and American Hard Rubber had signed wage increase contracts with the URWA, granting their employes 13¢ more an hour, were also made in late August.

Chemical Exposition

All available exhibit space on four floors of Grand Central Palace, New York, N. Y., will be occupied by 381 leading concerns at the twenty-third Exposition of Chemical Industries, to be held November 26 to December 1. Prominent in the show will be a great deal of processing equipment that has been developed or redesigned to meet demands for greater capacity per ton of mass and per cubic foot of capacity. Exhibits will cover new manufacturing materials, new and more efficient machinery and equipment to meet the needs of intensified operations, and new products.

Changes at Cyanamid

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., has expanded its technical service for users of Laminac polyester resins in the Midwest. The former Midwest territory has been divided into two areas, with Henry Dutot assigned to Ohio and southwestern Michigan, and Irving Schupp to the balance of the Midwest. Mr. Dutot, who will make his headquarters in Cleveland, has been with the company since 1935 and has spent 11 years working on polyester, melamine, and urea resins. Mr. Schupp joined Cyanamid in 1942, has worked on Laminac resins since 1945, and will operate out of the Chicago office.

Sheldon T. Dahl has been named West Coast manager of Cyanamid's industrial chemicals division and plastics and resins division and will direct the two divisions' sales and production activities in the West Coast territory. Mr. Dahl came to the company as West Coast sales manager when his Los Angeles sales and distribution firm, S. T. Dahl Co., was acquired by Cyanamid in 1948. Mr. Dahl's entire staff went with Cyanamid at that time.

Cyanamid has also promoted Herbert G. Pratt to manager of the San Francisco office of the industrial chemicals division. Mr. Pratt joined the company as a member of its sales staff in Los Angeles with the Dahl company, of which he was a partner.

Richard F. Warren was named a senior market research analyst of the market research section of Cyanamid's new product development department. For the past five years he was market editor for *Chemical Engineering*.

E. D. Powers, vice president in charge of production, was elected to the board of directors to succeed H. P. Eastman, who retired August 31.

A. J. Campbell, general manager of the industrial chemicals division, and Howard Huston, assistant to the president, were elected vice presidents; while L. C. Duncan was made assistant to the president.

Other executive changes announced last month were the election of J. J. Murray and G. C. Walker as assistant treasurers, and J. W. King, and W. B. Ward as assistant comptrollers.

Resin for Armatures

Electrolux Corp. has built two new machines for impregnating the armatures of electric motors with polyester resin made by American Cyanamid. Each machine measures 24 feet long, four feet wide, and eight feet high. Each machine handles 300 armatures per hour and is operated by one man. The armatures are locked in place on a moving conveyer belt, heated to drive out any moisture present, allowed to cool, and impregnated with the resin. The resin is flowed on to the armature coils at four different points in the conveyer line, with the time of impregnation between applications being about one minute. Positive displacement pumps control the amount of resin applied, and excess resin is recirculated and reapplied. After impregnation, the armatures are heated at 275° F. for 35 minutes to cure the resin. The entire cycle takes about 1¼ hours, and is said to be quicker, cheaper, and more satisfactory than the phenolic varnish impregnating process formerly used for the armatures.

Dedicates New Building

Seiberling Rubber Co., Akron, O., formally dedicated its new southeastern district office and warehouse building at 5008 Peachtree Rd., Chamblee, Ga., July 13.

President J. P. Seiberling officiated at the ceremonies. Also participating was W. J. Johnson, the company's Atlanta district manager.

Containing some 20,000 square feet in floor space, the one-floor structure is 100 by 200 feet. About 16,000 feet have been assigned to warehousing, and the remainder will be used in office and display rooms. A fireproof room, 15 by 17 feet, will be used for storing inflammable materials. To facilitate shipping, a loading dock has been constructed at one end of the building, with a railroad siding at the opposite end.

David R. Goldsberry, for the past three and a half years a reporter for the *Athens Messenger*, has joined the public relations department at Seiberling, where he will work on press and radio relations and trade paper publicity for the company and will also work with Leslie Johnston on internal public relations problems.

Financial World, 86 Trinity Pl., New York 6, N.Y., last month announced that from the 5,000 corporation annual reports for 1950 rated in its eleventh annual survey, 14 rubber and tire companies have qualified for "Highest Merit" citations: American Hard Rubber Co., Armstrong Rubber Co., Dayton Rubber Co., Dunlop Rubber, Ltd., Firestone Tire & Rubber Co., The General Tire & Rubber Co., The B. F. Goodrich Co., Goodyear Tire & Rubber Co., Hewitt Robins, Inc., Midwest Rubber Reclaiming Co., Seiberling Rubber Co., Thermoid Co., Thiokol Corp., United States Rubber Co. The stockholder reports of these companies have thus become candidates for the final judging, and one will be selected for a "Best of Industry" award and presented with a bronze "Oscar of Industry" at the *Financial World* annual report awards banquet on October 29, at the Hotel Statler, New York. A year ago Goodyear's 1949 annual report won the trophy for the best report in this industrial classification.

Martin Rubber Co., Long Branch, N. J., has appointed Joseph G. Seck vice president in charge of sales. He was formerly sales manager of the conumer products division of Davidson Rubber Co., and previous to that had been with the manufacturing division of McKesson & Robbins, Inc., and also with The Rubber Manufacturers Association, Inc. This appointment to a new position is part of the expansion program of Martin Rubber, which now manufactures industrial molded, lathe-cut, and extruded rubber parts, rubber toys, rubber hardware and household parts, shower sprays, and dental supplies.

Gro-Cord Rubber Co., Lima, O., has made Forest Moor vice president and general manager of the company to succeed in the latter capacity Kyle L. Menuez, who recently resigned to head the rubber division of Ball Bros., Inc., Muncie, Ind.

Mr. Moor started with the heel and sole manufacturing concern in 1943 and returned to it after military service in 1945. He was elected secretary-treasurer of the company in January, 1946.

Sales Appointments

Austin L. Hawk has been named assistant manager of the western sales district, Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J. Mr. Hawk is located at the western sales district offices at 445 Lake Shore Dr., Chicago, Ill., where for many years he has served in various capacities.

S. V. V. Hoffman has been made regional manager of Raybestos-Manhattan's West Coast sales division for southern California, with headquarters at 4651 Pacific Blvd., Los Angeles.

Other advancements also announced recently are the appointments of A. N. Johnson, Jr., as assistant manager of the central sales district, Manhattan Rubber, with headquarters at 810 Empire Bldg. Pittsburgh, Pa., and of D. H. Cottrille as West Virginia regional manager at Clarksburg.

Forms Chemicals Division

The Pittsburgh Coke & Chemical Co., Pittsburgh, Pa., producer of plasticizers and basic chemicals, has formed a new fine chemicals division, with an anticipated manufacturing program that includes a selected range of dyestuffs, pigments and intermediate products, pharmaceutical intermediates, textile auxiliaries, and other chemicals.

L. D. Barrick has been appointed manager of the new division, and R. M. Locke assistant manager.

Dr. Barrick has had wide production, research, development, and engineering experience in petroleum chemicals, dyestuffs, intermediate products, pigments, and general organic synthesis. He has worked with Gulf Oil Co., General Aniline & Film Corp., and as a consultant. During the past four years he was Chemical director of Arnold Hoffman & Co,, Inc., dyestuff division, in charge of research development and production.

Mr. Locke served as technical director of dye plant for Arnold Hoffman, as colorist at General Aniline, and as group leader of application section for General Aniline. In his new position at Pittsburgh Coke he will supervise sales, technical service, and sales service, as well as aid with production in the fine chemicals division.

Completes Laboratory Unit

Pittsburgh Coke has completed the first major unit of its new central research laboratories at Neville Island, near Pittsburgh. The new unit more than doubles the company's available laboratory space and centralizes a number of research groups previously located at several different points on Neville Island.

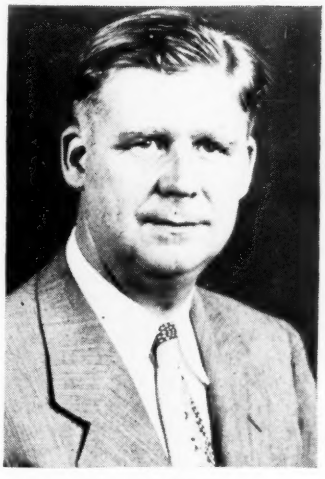
R. M. Marshall, president of the company, stated that the new laboratories are designed to take care of the additional research requirements stemming from the company's expanding production of chemicals. He pointed out that the research needs of the company's new fine chemicals division, expected to be in operation by the end of the year, were of immediate importance and that further expansion, primarily in the field of synthetic organic chemicals, is indicated in the future.

The new laboratories are unique in that they are constructed primarily of Pittsburgh Coke products. Precast concrete curtain walls, fabricated by the company's concrete products division, are hung on a steel frame of standard design. Floors and roof are of precast concrete structural members also made by the company.

A Pittsburgh lightweight aggregate block is used for interior wall partitions. In addition, one of the company's bituminous coatings is used to seal all exterior walls, and its synthetic coatings are applied to all exposed metal surfaces.

Pittsburgh Coke has received an additional government contract for activated carbon for protection against chemical agents. The contract amounts to $309,000 and brings to $805,000 the total of such contracts held by the Activated Carbon Division of the Pittsburgh Coke & Chemical Co.

L. D. Barrick



R. M. Locke

The Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. is erecting an addition to its Research Laboratory Building at 1 River Rd., Edgewater, N. J., and a new Applications Research Building on the same property. The new facilities will accommodate Barrett's expanded Applications Research on such products as phenolic, alkyd and other resins, plastics, plasticizers, tile resins, rubber chemicals, fertilizers, as well as investigation of uses of new products.

Fine Safety Program

Kentucky Synthetic Rubber Corp., operator of the government-owned copolymer plant at Louisville, Ky., received high praise for its safety program from H. J. Joy, Jr., manager of the safety section of the Office of Rubber Reserve, RFC. In a letter to General Manager Henry F. Palmer, Mr. Joy stated that "a continuation of the program along the lines presently being pursued should lead to the development of one of the best overall safety programs in the entire synthetic rubber industry." The company has had only one lost-time accident since the plant reopened on December 11, 1950, with completely inexperienced and untrained personnel, and reactivation and construction work is still going on. At present the safety record shows over one-half million man-hours worked without a lost-time accident. The company's safety program is under the direction of Emerson R. Boner.

At present, the plant is the only one of the 27 in the synthetic rubber industry where all plant employes wear safety glasses, safety shoes, and safety hats. Hats and individually fitted glasses are supplied without charge, while shoes are available at cost to employes. An instructor's course in first aid, given by the Bureau of Mines, is now being taken by 15 key men who will, in turn, give training to all plant employes. A new fire training ground is geared to provide knowledge and practice in fighting fires and will be utilized for daily fire drills. Periodic safety and housekeeping inspections are made by the department managers, and regular weekly inspections are made by an employe safety and housekeeping committee.

More Alkylamine Available

To take care of increasing demands for alkylamines, Sharples Chemicals, Inc., Philadelphia, Pa., has substantially increased its productive capacity. The new unit, completed in July, is now in operation.

Sharples, one of the oldest commercial producers of amines in the United States, first offered these products to industry in 1935. Since that time a broad program of expansion in the amine field has been followed. Many new amines have been added, and many new applications have been developed.

Most alkylamines are used as intermediates. Expanding fields of application include the following industries: rubber, agriculture, pharmaceutical, textile, plastics, paper, petroleum, and paint.

Taylor Instrument Cos., 95 Ames St., Rochester 1, N. Y., has released a new 16-mm. color film depicting the growth and significance of instrumentation. Entitled, "Information at Work," the film is a 30-minute feature of the narrative type and is aimed primarily at audiences whose understanding of industrial instrument application would be enhanced by a sweeping view of the whole field. For professional instrument men and students of technical and engineering schools there are sequences demonstrating control effects, instrument manufacture, and applications. Taylor is handling distribution of the film, and requests for loans by technical societies, instrument engineers, science classes, civic clubs, etc., should be made to the company's public relations department.

A. Clarke Mack, Jr.

Mack, Gamble with Sun

Appointment of A. Clarke Mack, Jr., and Gene Gamble to key administrative positions with The Sun Rubber Co., Barberton, O., manufacturer of rubber toys and playthings, was announced last month by President Thomas W. Smith, Jr.

Mack has been named assistant to the president, and Gamble, director of public relations.

Mack brings to his new position a background of 13 years in the rubber industry, including experience in market analysis and distribution, sales promotion and management, production allocation and scheduling, and public relations and advertising. He was most recently manager of belt sales for The B. F. Goodrich Co., with which he had been associated 11 years. During World War II he served on the WPB Industry Advisory Committee and formerly was a member of the NPA and OPS industry advisory committees.

Gamble has a broad background in the public relations field, having served with The Hercules Powder Co. in an editorial capacity and with the Palm Springs, Calif., office of E. F. Hutton & Co. During World War II, he was associated with the U. S. Army's Manhattan Atomic Project at Los Alamos.

To Build in Kentucky

B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O., will construct a new plant in Calvert City, Ky., on a tract comprising about 175 acres, and on completion it will represent an investment of more than $5,000,000.

Major considerations in the decision to build in Calvert City were the availability of essential raw materials and power, and accessibility to water transportation on the Tennessee River, plus the desire to disperse company facilities in the interests of national security.

Three buildings to house manufacturing operations, service and maintenance facilities, power plant and offices will be under way shortly after final Defense Production Authority approval to construct the plant is granted. The project is expected to be in operation late in 1952 or early in 1953.

First material to be produced in the Calvert City plant will be vinyl chloride monomer to be shipped in bulk to the Goodrich Chemical plant in Avon Lake, O., and to supplement supplies made at Louisville, Ky. This monomer is used in the company's versatile line of Geon resins currently used in a wide range of plastics applications and products.

PVC Plant Starts Operations

Production has started at the recently completed polyvinyl chloride plant of Goodrich Chemical at Avon Lake, O. Covering seven acres of the company's 225-acre tract, the plant (see accompanying illustration) consists of two large buildings—a three story process building (*right*) and warehouse (*left*). The new manufacturing facilities will produce Geon polyvinyl chloride resins, supplementing production of the company's plants at Louisville, Ky., and Niagara Falls, N. Y. Construction of the Avon Lake plant began in late 1950 and was completed in record time. Plant manager is D. L. Matthews.

Propeller Uses Hycar

An airplane propeller filled with hard sponge rubber is now being manufactured by Hamilton Standard Division, United Aircraft Corp. Light, hard, and strong, the sponge is used to fill the void between propeller blade core and shell, keeping the shell from vibrating under extreme pressures and supporting it against the impact of rocks, ice, or other material thrown up by the plane's undercarriage. The sponge filling compound, called HS 160, has three principal components: Hycar OR-15 made by Goodrich Chemical, phenolic resin, and nylon. Azodiisobutyronitrile is used as the blowing agent to foam this rubber-resin blend up to eight times its former mass. After foaming at a temperature of 300° F., the compound cools into a light, rigid sponge. Ebonite was originally used as a cavity filling in hollow steel propellers. HS 160 has several advantages over the ebonite filling since it is three to four times more resistant to impact, has greater tensile and fatigue strength and greater resistance to torsion, and requires 25% less processing time.

New York Quartermaster Procurement Agency, 111 E. 16th St., New York 3, N. Y., recently announced the awarding of the following contracts for: *inflatable sleeping pads*, to New York Rubber Corp., New York, in excess of $250,000; *synthetic rubber-coated raincoats*—all orders in excess of $250,000—to Cable Raincoat Co., Boston, Mass., United States Rubber Co., Washington, Ind., Rainfair, Inc., Racine, Wis., Sigmund Eisner Co., Red Bank, N. J., Marathon Rubber Products, Wausau, Wis.

Plastic Part Cuts Costs

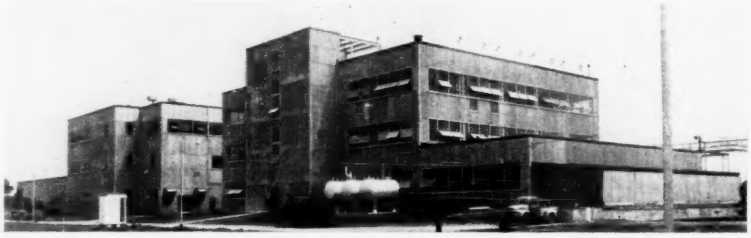
General Electric Co., chemical division, Pittsfield, Mass., has announced that its G-E 12487 rubber-phenolic compound has been used by the Precision Equipment Co. to reduce by 75% the costs of the cylinder shields and handles for its one-man portable tree saw. These parts were formerly cast from magnesium alloy, with high costs for material, machining, and painting. The rubber-phenolic compound is molded to required shape in the curing operation and is lighter in weight than the magnesium alloy. The new parts have the required heat resistance for the application and with their resistance to impact protect the saw engine from abuse in service.

Personnel Changes

Paul Stahlberg, of the chemical division, has been appointed sales development supervisor of G-E rubber-phenolic molding compounds. He has been with G-E since 1948 as a sales specialist on molding compounds.

Arthur T. Bourgault, also of the chemical division, has been appointed manufacturing analyst for the chemical materials department. Mr. Bourgault started with the company in 1935 in the business training course at Schenectady. Following his graduation, he was transferred to Alabama to handle the accounting in connection with the installation of G-E equipment on the TVA project. After 13 months, he went to the accounting section of the G-E plastics department and after a series of assignments became assistant to the supervisor of accounting in July, 1946, and in November, 1946, was transferred to cost accounting, where he was named the following year assistant supervisor of cost for the plastics department. In 1948 he was made supervisor of cost and accounting for the phenolic products plant.

Whittaker, Clark & Daniels, Inc., 260 W. Broadway, New York 13, N. Y., is again importing both high and low gel types of white Italian Bentonite clay. For several years on the scarce list, this colloidal clay is used as an absorbing, dehydrating, sizing, emulsifying, spreading, suspending, thickening, and plasticizing agent in the rubber, adhesives, pigments, paper coating, soap, cosmetic, textile, paint, and pharmaceuticals industries. The company will also continue to represent American Colloid Co. as eastern distributer of Volclay and Panther Creek Bentonites, both domestic products. Volclay is prepared in both powdered and granular forms; while Panther Creek differs from Volclay in that it is practically non-gel forming and non-suspending in water. Both of these clays are gray in color and suitable for applications where color and high purity are not factors.



New Vinyl Resin Plant of B. F. Goodrich Chemical Co., Avon Lake, O.

New Latex Laboratory

A new latex laboratory representing an increase of 100% in du Pont facilities for application research in latices has just been opened at Deepwater Point, N. J., by the rubber chemicals division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. The laboratory is housed in a new two-story wing adjoining the existing rubber laboratory. The cost of construction was approximately a quarter of a million dollars.

Like the older rubber laboratories, the new one has been established primarily to give technical aid to rubber goods manufacturers and manufacturers of other products of which rubber might be an essential part. As in the past, the company is making its services available for work on rubber and GR-S latices as well as on its own neoprene latex.

"As the rubber industry has grown in size and complexity of products," said Samuel Lenher, assistant general manager of the organic chemicals department, of which the rubber chemicals division is a part, at the new laboratories dedication ceremonies, "the du Pont company has recognized an increasing obligation to keep pace in its capacity to render technical service. Problems and opportunities in the field of latices," he added, "have become especially pressing in recent years."

After spending three years and almost a million dollars on research, du Pont has developed a new and economical way to add its synthetic rubber, neoprene, to paper. The neoprene is added as latex to the paper pulp, and the result is a new family of low-cost specialty papers made directly on the paper machine.

Outstanding properties imparted by neoprene are wet strength, chemical resistance, and all-around improvement in such physical properties as elongation, burst strength, impact strength, scuff resistance, fold endurance, and internal bond strength. Some successful applications where these properties have already been utilized include: linoleum backing, industrial filter paper, imitation leather, gasket paper, multiwall bag paper, and general packaging paper.

For the preparation of experimental papers, the laboratory is equipped with the following equipment: four beaters of ¾-, 1½-, 2½-, and 5-pound capacity; freeness tester; especially designed 36-inch drum dryer; 12- by 12-inch sheet forming equipment; 18-inch press section, 8- by 8-inch. Also, a Noble & Wood sheet forming machine with variable white water return system, and coating machines, calenders, offset and letterpress printing equipment, and a 40-ton platen press for embossing and laminating studies, are available.

For testing experimental papers, the staff has at its disposal—in addition to the standard equipment for porosity, smoothness, fold, etc.—the following specialized research tools: Instron and Tinius-Olsen tensile testers, a unique puncture tester, special resilience and internal bond testers, Scott variable temperature wet-tensile tester, dry tensile testers for use up to 250° F., and cold boxes for testing impact and adhesive strength of laminates at temperatures down to —90° F.

"As a service organization," says R. H. Walsh, of the laboratory's technical staff, "our primary job is to undertake experimental work for manufacturers who wish to know how the addition of neoprene will affect the properties of their paper."

Epstein Promoted

Edward M. Epstein, on rayon operations almost from their start 30 years ago by E. I. du Pont, has been appointed manager of a newly created quality control section of the nylon division. Employed as a chemical operator at the Buffalo plant in April, 1922, Mr. Epstein has filled many important technical and production posts at plants in Old Hickory, Tenn.; Richmond, Va.; and Buenos Aires. Since November, 1950, he has been technical superintendent at the Old Hickory plant.

Humphreys Board Chairman

H. E. Humphreys, Jr., president of United States Rubber Co., Rockefeller Center, New York 20, N. Y., has been elected chairman of the board of directors, but will continue as president.

Mr. Humphreys succeeds Herbert E. Smith, chairman and former president, who retired August 31. Mr. Smith is continuing as a director and member of the finance committee.

The board also elected John W. McGovern, vice president and general manager of the tire division, a member of the executive committee. Howard N. Hawkes, assistant general manager of the tire division, was elected a vice president and appointed by Mr. Humphreys as general manager of the tire division to succeed Mr. McGovern.

Mr. Humphreys joined the company as a vice president, director, and member of the finance and of the executive committees in 1938. On January 1, 1942, he was given the additional responsibility of heading the finance committee and later in the same year was elected vice chairman of the executive committee. He became president and chairman of the executive committee January 1, 1949.

Fabian Bachrach

H. E. Humphreys, Jr.

Mr. McGovern started with the company as an accountant in 1920. A steady series of promotions led to his appointment as general manager of the munitions division in 1941 and as general manager of the tire division in 1943. He was elected a vice president in 1945 and a director on April 17, 1951.

Mr. Hawkes joined the company as a tire adjuster in New York in 1912. He worked his way up through the tire sales organization to general sales manager of the tire division in 1933 and assistant general manager in 1943.

Other U. S. Rubber News

Frank B. Molen, Midwest technical sales representative for Kralastic molding powders and Vibrin polyester resins manufactured by Naugatuck Chemical division, has moved his headquarters from the division's plant in Naugatuck, Conn., to the division's branch office at 247 E. Exchange St., Akron, O.

Richard H. Malamphy, technical sales representative for these Naugatuck products along the eastern seaboard, has established new headquarters in the division's branch office at 254 Fourth Ave., New York, N. Y.

U. S. Rubber has resumed volume manufacture of its Koylon foam rubber cushioning for home upholstery. In addition to the one-, ¾-, ½-, and ¼-inch thicknesses previously made, the material is now also available in a 1¼-inch thickness. All thicknesses are made in 36- by 60-inch sheets and in soft, medium, and firm densities. The cushioning will be sold through department stores, furniture stores, and other shops selling home upholstery materials.

"Basketball Fundamentals," a 16-mm. sound film having a 22-minute running time, was recently made by U. S. Rubber in cooperation with the Minneapolis Lakers of the National Basketball Association. The film shows close-ups of fundamental plays, both offensive and defensive, and has a commentary by Marty Glickman. The new film is available free of charge through the company's Keds sports department for showing to high school, junior high school, and other sports groups.

A Part of the New du Pont Latex Laboratory Showing the Special Paper Making Equipment

Diamond Alkali Expanding

Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, O., at a meeting in Pittsburgh, Pa., August 2, voted to recommend to company shareholders, at a special meeting to be held soon, to split the common capital stock of Diamond on the basis of two shares for one of the present shares. In its six-month report, ended June 30, 1951, the company stated 1,086,854 shares were issued and outstanding at that time.

Diamond Alkali and Kolker Chemical Works, Inc., Newark, N. J., on August 6 announced that Diamond has arranged to obtain all the common capital stock of Kolker in exchange for 33,500 shares of Diamond's common stock, subject to approval by Diamond shareholders at a special meeting called for August 30. In making this announcement, Diamond President Raymond F. Evans stated that if the acquisition is made, no change in Kolker Chemical Works' management is contemplated.

Diamond operates 12 plants throughout the country; while Kolker, with plants at Newark, N. J., and Houston, Tex., manufactures organic insecticides and agricultural chemicals.

Also scheduled to be passed on at the special meeting of Diamond shareholders was a proposed two-for-one split of Diamond's capital stock recommended by the board of directors.

Diamond Alkali has also announced a two-year, multi-million dollar expansion program for its Painesville, O., plant. According to President Raymond F. Evans, the program calls for extensive enlargement and modernization of present facilities to permit increased production of caustic soda and chlorine by the electrolytic method. The program also includes construction of a new plant for producing perchlorethylene solvent. Besides doubling Diamond's present capacity for chlorine and caustic soda by the electrolytic method, the program will enable the company to abandon the traditional lime-soda process for manufacturing caustic. The ultimate effect of this move will be to make available to industry a substantially greater tonnage of soda ash now used in the lime-soda method. Commercially produced on a limited scale since 1948 at Diamond's Houston, Tex., plant, perchlorethylene will now be made at Painesville to meet increased demand from nearby eastern and midwestern markets.

Franklin, Kuzy Advanced

W. B. Franklin has been made manager of The General Tire & Rubber Co's., Kraft system research and training center in Akron, O., according to A. R. Carr, manager, Kraft service and accessory sales. Steve Kuzy was named assistant manager. Both men have been serving temporarily since the grand opening of the center this year.

"These men have many years experience in all phases of the rubber industry," Carr said, "and we feel that they are particularly well qualified for training General's distributer representatives."

Located near General's Akron plant, the new center is used as a training unit for tire men from all parts of the nation. The repairmen study concentrated courses in Kraft system methods and equipment. New tire conservation theory and methods developed in the company's laboratories are also tested there.

Controllers Elect

Controllers Institute, 1 E. 42nd St. New York 17, N. Y., last month issued the following membership notes.

Frederick L. Patton, vice president of Cambridge Rubber Co. Cambridge, Mass., has been elected president of the Boston Control of the Institute.

At the annual meeting of the New York City Control, Allen H. Ottman, vice president and director of American Hard Rubber Co. was chosen vice president.

E. H. Paradies, control manager at United States Rubber Co., Los Angeles, Calif., has been named a vice president of the Los Angeles Control.

The new director of the San Francisco Control is Westley H. De Sellem, controller of the Pacific Rubber Co., Oakland, Calif.

In New Orleans, La., J. M. Stonnell, controller of Copolymer Corp., Baton Rouge, was similarly honored.

H. E. Humphreys, Jr., president, United States Rubber Co., will be guest speaker at the opening luncheon of the twentieth annual meeting of the Controllers Institute. Arthur Surkamp, treasurer of the rubber company, is serving as general chairman of the gathering, which will take place September 30 to October 3, in the Waldorf-Astoria, New York.

Post, Cummins Transferred

Transfer of J. B. Post, in charge of sales for the films and flooring division, from the Chicago district to Los Angeles as West Coast district manager, and appointment of Gordon W. Cummins to the Chicago post, were announced last month by the Goodyear Tire & Rubber Co., Akron, O.

Post joined Goodyear as a Pliofilm salesman at New York in 1940; later became assistant manager of packaging sales at Akron; moved to Chicago as manager of Pliofilm sales in 1945; and was named films and flooring division manager there in 1949.

Cummin's service dates to 1942 as a field representative of Goodyear Aircraft Corp. He served two years with the Army Air Force, returning to Goodyear in 1946, assigned to the company's airship fleet as an advance representative. He was transferred to the Pliofilm sales staff in 1948, being assigned to Seattle, moved to Dallas in 1949 as district manager and to Chicago last year.

Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass., was honored by the American Chemical Society on a recent program of the Society's television show, "Magic Molecules." Company President Godfrey L. Cabot at the age of 91 made his first television appearance on the show and gave a brief history of the company and its growth since its origin in Pennsylvania in 1882. Owen J. Brown, Jr., vice president and general sales manager, elaborated on the production and sales aspects of the company's growth, pointing out that Cabot now manufactures more than one million pounds of carbon black per day. Walter R. Smith, chief research chemist, discussed the properties of carbon black and gave demonstrations of the results obtained in rubber, inks, coatings, and plastics products.

Goodrich Personnel Notes

Employes in injury-free departments at The B. F. Goodrich Co.'s Akron, O., plants won 104 puncture sealing tubeless tires in safety drawings during the first seven months of this year. In addition, scores of employes were awarded $10 safety shopping certificates when a new seven-month safety record was set August 1. According to Safety Director Tom J. Cain, this new record of only 42 disabling accidents for seven months compares with 46 accidents for a similar period last year and, when figured in man hours lost, is 20% better than the 1950 level and 10% better than in 1949 when Goodrich won the National Safety Council's Distinguished Service to Safety Award.

Robert Price has been made sales manager of the plastic products division with headquarters in Marietta, O. Price, with Goodrich 13 years, was named manager of the development department in 1948.

Robert Mansfield takes over Price's previous post. Mansfield has been with Goodrich 11 years, for the past four as technical group head at the Marietta plant of the plastic products division.

Edgar T. Gregory has been appointed manager of flat belting sales, succeeding A. Clarke Mack, resigned, and has been succeeded as operating manager of the industrial products sales department by Donald E. Schlemmer.

With the company seven years, Gregory started as a senior sales development man in his division and became operating manager in 1945.

Schlemmer started with Goodrich 15 years ago at Plant 4 and has been a senior sales development man for the last several years.

Eldrid A. Kunze has been named manager of the retail service supervision department of replacement tire sales division, succeeding Raymond S. Jenkins, now manager of the Harrisburg, Pa., retail store. Kunze, with Goodrich 16 years, served in various districts, then was brought to Akron as a specialist on recapping, and since 1947 had been a supervisor in his present department, which handles equipment problems for retail outlets.

Improved De-Icing System

The Navy's versatile AD-Skyraider ras an improved pneumatic de-icing system said to be most efficient in breaking ice formations and capable of withstanding the speed of this attack bomber without lifting from the wing surfaces. Developed by Goodrich in collaboration with the Bureau of Aeronautics, the Navy, and Douglas Aircraft engineers, the new design exerts greater strain between ice and rubber to produce faster ice-breaking action. Changes in the new de-icers include smaller air tubes, greater air pressure, and a faster inflation and deflation cycle.

Heyden Chemical Corp., 393 Seventh Ave., New York 1, N. Y., has leased an entire floor at 342 Madison Ave., for occupancy in early 1952. Heyden plans to use the new space for its executive offices and also as headquarters for the sales offices of its subsidiary, American Plastics Corp., and the Heyden medical department, now at 225 W. 34th St. The new offices at 342 Madison will also be used as headquarters for the company's market development, technical sales and advertising departments now at Heyden's Garfield, N. J., division.

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Menuez with Ball Brothers

Ball Brothers Co., Muncie, Ind., has appointed Kyle L. Menuez general manager of the rubber products division with plants and offices in Muncie. Mr. Menuez joins the staff of the company's chief operating officer, Duncan C. Menzies, executive vice president and general manager. Mr. Menuez recently resigned a vice presidency and the general managership of the Gro-Cord Rubber Co., Lima, O., to become associated with Ball, but will continue on the Gro-Cord board.

The appointment of Mr. Menuez was the sixth in a series of major changes Ball has been making since the first of the year to simplify operations through a decentralization of management; the purpose is to provide the company with a stronger operating group of sufficient depth to meet demands on a business that had outgrown older management lines. Ball Brothers is engaged primarily in manufacturing glass containers, but also supplies commercial rubber goods, zinc, metal, and paper products.

Previous reassignments of responsibilities already have brought the establishment of four autonomous Ball divisions, including Ball Brothers Co. of California, with Hugh Crawford as vice president and general manager; a metal closure division and a zinc rolling mill division, with John W. Fisher, the vice president in charge of both, and a box and paper-board division, for which Burnham B. Holmes was named general manager. Rubber becomes the fifth new division.

Mr. Menuez will be responsible for establishing an independent organization for the manufacture and sale of Ball rubber products supplied to the automotive, aviation, and home appliance industries. Mr. Menuez also will be responsible for staffing all areas of his operation and for planning and executing all long- and short-term objectives in rubber and related products.

Mr. Menuez has been associated in various manufacturing and executive capacities with the rubber industry since 1929, except for a four-year period when he served as a consultant with a Chicago firm of management engineers. He was with Gro-Cord for the last six years and before that with Inland Rubber Corp., Firestone Tire & Rubber Co., and the India Tire & Rubber Co., Ltd., of Great Britain. Only recently Mr. Menuez completed a second term as president of the Rubber Heel & Sole Institute and, on two different occasions, was a director of the Elastic Colloid Research Corp., Boston, Mass. A few weeks ago he accepted limited assignments of technical nature with the government's advisory committees for the rubber industry.

Join Wyandotte Chemicals

Paul W. Blume, formerly secretary and director of development at Michigan Chemical Corp., has joined the market development staff of Wyandotte Chemicals Corp., Wyandotte, Mich. Mr. Blume's previous experience includes research and market development work with petroleum chemicals, insecticides, and general organic chemicals. At Wyandotte he will be concerned with the development of markets for products resulting from the expanding organic chemicals program.

Paul W. Blume

James R. Taylor recently came to Wyandotte Chemicals to conduct development of specialized cleaners for the aircraft and automotive equipment industries. He will work out of the Los Angeles, Cal., laboratory. Previously he had been chief chemist at Norton Air Base, where he dealt with chemical processes important to aircraft overhaul.

Donald E. Trucker, having recently completed work for a Ph.D. degree at Polytechnic Institute of Brooklyn, is now with Wyandotte Chemicals, where he will work on the synthesis of organic compounds and surfactant development.

New Plastics Plant

(*Continued from page 705*)

the recently completed unit in Long Beach, Calif., and the big headquarters plant at Springfield, Monsanto will be able to provide greater service to molders in the East, the Midwest, and the Far West it was explained.

Initial operations of the new plant call for production of Lustrex styrene molding materials and Resinox phenolic resins. Installation of equipment will begin immediately, with production expected early next year.

The Ohio site was purchased from the United States Pipe & Foundry Co. Founded in 1887, the Ohio plant has been shut down for two years. Construction and salvage operations at the plant are now under way.

Personnel already selected for the plant include the following appointments.

M. F. X. Gigliotti has been made project construction manager, according to William T. Dickens, plant manager, who also announced the appointment of George Drebo as assistant construction engineer.

Mr. Gigliotti has been serving as assistant maintenance superintendent at the Springfield plant; while Mr. Drebo, who started with the phosphate division unit at Monsanto, Tenn., has been employed in the maintenance department.

Robert M. Aude has been named production superintendent of the Addyston plant. He joined Monsanto's plastics divison in 1937 as a chemist; in 1942, became group leader of a process investigation group; in 1944 was appointed supervisor of the sheet finishing department; from 1944 to 1946, served as supervisor of the continuous process department; and from 1946 to 1947, was operating superintendent of the thermoplastic molding compound division. Since May, 1947, Mr. Aude has been general superintendent of the transportation and materials department at Springfield.

C. R. Robinson has been chosen personnel relations superintendent at the new plant. Mr.. Robinson began with Monsanto in 1942; later became a group leader and development chemist at the Monsanto, Ill., plant laboratories; in 1946, was transferred to the plastics divsion as assistant to the director of research; in 1947, was named employe relations manager of the division; and since December, 1950, has been personnel manager of the Springfield plant.

Alvin E. Bemarkt has been selected as plant accountant at Addyston. He joined Monsanto in 1947 as an accountant; was transferred to the Camden, N. J., plant in 1942 as plant accountant; served in the U. S. Army from June, 1944, until February, 1946; in 1947, transferred to the Springfield plant as property accountant; became assistant chief accountant in June, 1949, and plant accountant three months later.

John J. Healy, Jr., has been appointed assistant to Carroll A. Hochwalt, vice president in charge of research, development, and patent activities. Mr. Healy has been assistant general manager of Monsanto's Merrimac Division at Everett, Mass. He had joined Merrimac Chemical Co. in 1921 as a control chemist and became a research chemist in 1922. In 1929, Monsanto acquired Merrimac, and a year later Mr. Healy was made an assistant in technical service for the Merrimac Division. He became director of development for the division in 1935 and assistant general manager in 1947.

Monsanto in Japanese Venture

Monsanto has formed an associated company in Japan with Nipponkasei Chemical Industries, Ltd., Tokyo. The new company, Monsanto-Kasei Kogyo, K. K., will operate plants at Yokkaichi and Nagoya for the production of plastics and other chemicals.

The company, formation of which has been approved by the Japanese Foreign Investment Commission, will manufacture vinyl chloride monomer, Ultron polyvinyl chloride resins and compounds, and Santicizer 160, a Monsanto plasticizer used in the manufacture of vinyl plastics. Two plants, recently completed by Nipponkasei, will be expanded to provide facilities for the new products.

Nipponkasei also operates a large factory at Kurosaki, Kyushu, where it produces fertilizers, coke, dyestuffs, and pharmaceuticals.

Monsanto entered the vinyl chloride market in the United States in March, 1947, following three years of extensive pilot-plant production. Since that time the company has been making the product at its plastics division plant at Springfield, Mass., under the trade name Ultron. The plastic is also produced at Monsanto's Montreal, Canada, plant and in May, this year, the company announced the formation of a Brazilian subsidiary to produce the same material.

Operations of the new Japanese company will mark Monsanto's first manufacturing in the Orient. American technical personnel will be transferred to Japan to take part in the management.

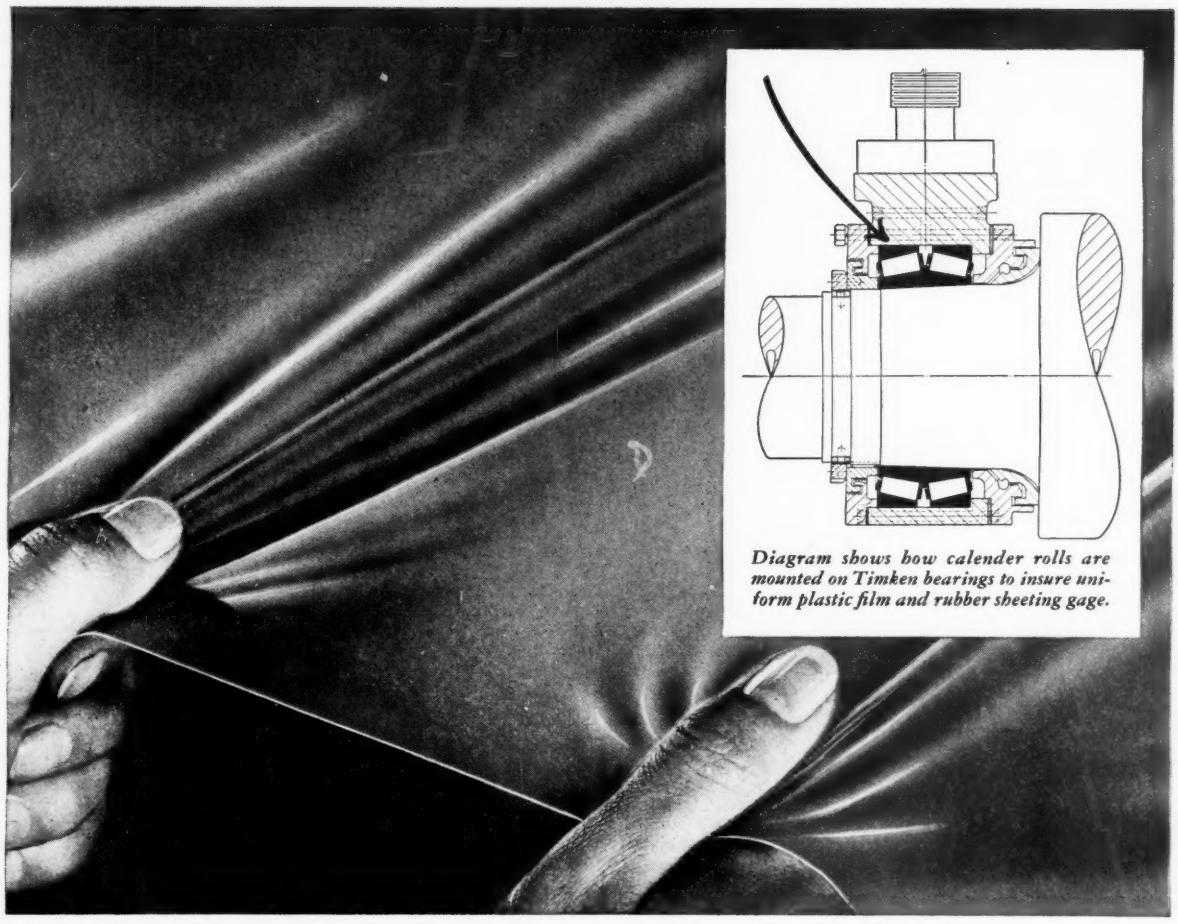

Diagram shows how calender rolls are mounted on Timken bearings to insure uniform plastic film and rubber sheeting gage.

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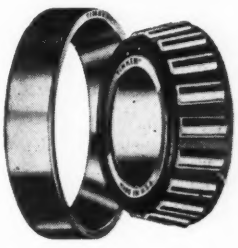

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Molding Silicone Rubber

The Minnesota Silicone Rubber Co.'s new plant at 5758 W. 36th St., Minneapolis, Minn., went into initial production in August. The new company, an affiliate of Minnesota Rubber & Gasket Co., also of Minneapolis, will produce only molded silicone rubber parts.

According to company officials, this is probably the only plant in the country devoted exclusively to molding silicone rubber. Company engineers decided to separate silicone production completely from other rubber processes to maintain absolute purity in compounding and preserve to the highest possible degree the characteristics of this material.

A special injection molding process developed by company engineers and believed unique in the industry makes possible the economical molding of silicone parts to extremely close tolerances with a very low rejection rate.

The new plant will employ 85 workers at capacity and will turn out 500,000 molded parts a day.

District offices are maintained in Chicago, Milwaukee, Detroit, Cleveland, and New York. The partners are Paul T. Dennison, George E. Carlson, and Robert W. Carlson. Burke Neff is plant manager.

OBITUARY

Sam Hershberg

SAM HERSHBERG, 53, president of Hershberg Products Co. Ashtabula, O., died suddenly of a heart attack, June 22.

He was well known in the storage battery industry. For many years he was with Aetna Rubber Co. rising to factory manager and comptroller. From 1932 to 1937 he was a partner and president of Advance Rubber Co. After several years as general manager of Dunne Rubber Co. he organized the Hershberg company in 1945 and was its president and general manager.

The deceased also held membership in the Masons.

William C. Adams

WILLIAM C. ADAMS, 53, secretary to the vice president of Goodyear Farms, a subsidiary of the Goodyear Tire & Rubber Co., at Litchfield Park, Ariz., died August 27 from injuries received in an automobile accident near Greencastle, Ind.

Born in Whipple, O., Mr. Adams started with Goodyear as a factory clerk in Akron. He later worked in the development department and the superintendent's office and also served as secretary to the late Cliff Slusser, vice president of Goodyear. Mr. Adams went to Litchfield Park as a secretary in 1927.

He is survived by his wife, his father, and three brothers.

The body was returned to Akron for services.

Edward H. Koken

EDWARD H. KOKEN, retired vice president and former general manager of Goodyear Tire & Rubber Co. of Canada, Ltd., Toronto, Ont., died July 28 at Peterborough, Ont., following a brief illness.

Born in Bethlehem, Pa. in 1876, Mr. Koken was educated in Plymouth, O. In 1901 he joined Goodyear Tire & Rubber Co., Akron, O., left a year later and returned once again in 1907 as assistant to Factory Manager Paul Litchfield. The deceased then became assistant factory manager in Bowmanville, Ont.; he then was made superintendent in 1910, plant superintendent at New Toronto in 1918, and finally vice president in charge of Canadian operations in 1940, a position he maintained until his retirement in 1946.

Mr. Koken was a member of Akron Lodge 83, F. and A.M., St. Patrick's Chapter of Toronto Knights Templar, the Rameses Shrine Templer, also of Toronto, and was a past president of the Lakeshore Golf & Country Club, Toronto.

Funeral services were scheduled in West Toronto at the Speers Funeral Chapel on August 1. Additional services were held at Rose Hill Burial Park, Akron, August 3.

Surviving are his wife and two sons, one of whom, Frank is employed at Goodyear Aircraft in Akron.

David Tumpeer

DAVID TUMPEER, 56, vice president and one of the founders of Witco Chemical Co., New York, N. Y. died August 14 in Grant Hospital, Chicago, Ill., after a short illness.

A native Chicagoan, he was educated in the local schools and began his business career with A. Daigger & Co., Chicago, dealer in industrial chemicals.

In 1920, with Robert I. Wishnick and his brother Julius, the deceased, as secretary, helped found Wishnick-Tumpeer Chemical Co., now Witco Chemical Co., which began with a single office and a staff of four people as a jobbing agency. The company's activities expanded, and it rose to a leading position in the chemical world with plants in Texas, New Mexico, New York, New Jersey, and Illinois and offices in New York, Chicago, Cleveland, Boston, Los Angeles, San Francisco, Houston, and London. Mr. Tumpeer, although taking an active part in the company's operations, continued to make Chicago his headquarters.

His widow, two sisters, and two brothers survive.

Funeral services were held August 17 in Anshe Emet Synagogue, Chicago, of which Mr. Tumpeer was a director and former treasurer, followed by interment in Memorial Park Cemetery, Evanston, Ill.

Christopher Harris

THE passing of Christopher Harris at the age of 66, occurred suddenly last month while he was on a service call in Ontario, Canada, for Farrel-Birmingham Co., Inc., Ansonia, Conn.

A native of Ansonia, Mr. Harris was first hired by the company in 1899 and for the past 40 years had been servicing F-B equipment in the field, specializing in grinding and polishing calender rolls in rubber and plastics manufacturing plants in the United States, Canada, and Mexico.

George T. Dyas

GEORGE T. DYAS, 66, superintendent of the North Bergen, N. J., plant of United States Rubber Co. and commissioner of the Housing Authority of Jersey City, died after a short illness August 25 at the Medical Center in Jersey City.

Mr. Dyas was a pioneer in the unloading of natural rubber latex in bulk quantities as it is shipped to this country from the Far East rubber plantations. During World War II he supervised the storage and handling of more than half of the nation's supply of latex.

Mr. Dyas joined U. S. Rubber in 1915 at the company's general laboratories, then in New York. He was promoted to foreman of unloading operations for the plantations division in 1923. In October, 1924 he became superintendent of the North Bergen plant.

A widower, he is survived by his brother, and several nieces and nephews.

A Requiem Mass was sung August 29 at St. Aedans Church, Jersey City. Burial wa at Holy Cross Cemetery, North Arlington, N. J.

Herman M. Koelliker

HERMAN M. KOELLIKER, vice president of Chicago Rawhide Mfg. Co., Chicago, Ill., died suddenly of a heart attack August 21.

Prior to coming to Chicago Rawhide he had been vice president and general manager of Ohio Rubber Co. and vice president and a director of Baldwin Rubber Co. His earlier experience included work with Grasselli Chemical Co., United States Rubber Co., Buckeye Rubber Co., and Tucker Rubber Co.

Mr. Koelliker joined Chicago Rawhide in 1936 to pioneer and develop the use of molded synthetic rubber products as precision machine parts particularly for difficult and critical applications. Under his management the Sirvene Division of the company has grown from a small technical staff to a technical and manufacturing division employing more than a thousand people. He became a vice president of the company in 1942.

Mr. Koelliker was born in Cleveland, O., 59 years ago. He was graduated from Case Institute Technology in 1914.

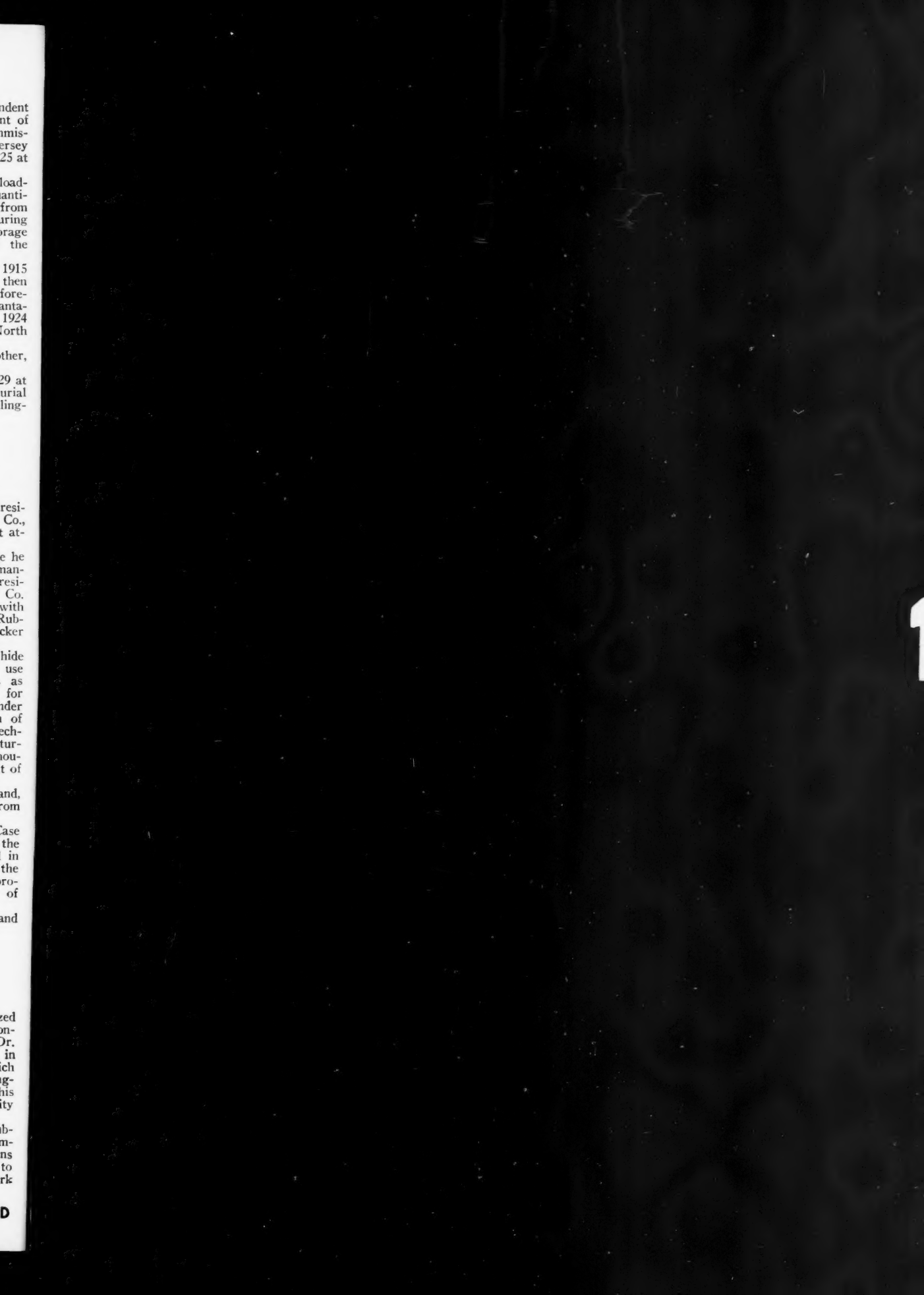
The deceased was a director of the Case Alumni Association and president of the Chicago Case Club. He was interested in and a contributer to the work of the Y.M.C.A. and was also active in the promotion of the National Association of Foremen.

Mr. Koelliker leaves three brothers and a sister.

D. F. Twiss

D. F. TWISS, internationally recognized expert on rubber, died at Barton-on-Sea, Hampshire, England, on May 23. Dr. Twiss, who was born in Birmingham in 1883, studied at Mason College, which later became the University of Birmingham, and held research degrees from this institution as well as from the University of London.

In July, 1914, he joined Dunlop Rubber Co., Ltd., as its first chemist and embarked on that series of investigations which was to prove of such importance to the rubber industry. There was his work



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on sulfur vulcanization and the use of accelerators which eventually led to the discovery of the powerful accelerator zinc isopropyl xanthate (ZIX) and to the use of metallic oxides, especially zinc oxide, in the presence of organic accelerators.

He also pioneered in the direct production of rubber articles from preserved latex, and his early experiments were responsible for the development of the important industries producing rubber thread and the newer forms of sponge rubber.

In the 32 years of his activities as Dunlop's chief chemist—from 1914 until his retirement in 1946—Dr. Twiss took out about 200 patents more than half of which related to latex. He also served on various committees of important rubber research organizations and was the author of a number of articles. In 1934 the Institution of the Rubber Industry recognized his contributions to rubber science with the award of the Colwyn Medal.

Clifton H. Carlisle

CLIFTON H. CARLISLE, a director and former president of Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., and one of that company's first personnel when manufacture of tires in the Dominion was started, died in Toronto, July 27, at the age of 81.

Mr. Carlisle was graduated from Hiram College and then went to Akron, O., where, in 1908, he joined Goodyear Tire & Rubber Co. as an auditor. Two years later he was sent to Canada where he was active both in the founding of the Canadian company and in the establishment of the Rubber Association of Canada. With Goodyear of Canada he served successively as general manager and treasurer, vice president, and then president. He retired as president in 1936, but remained on the board.

Prominent in civic affairs and a leader in the industry of the Dominion, Mr. Carlisle also held membership in the Canadian Manufacturers' Association, the Canadian Chamber of Commerce, the National Club, and the Lambton Golf & Country Club. He was board chairman and a past president of the Dominion Bank of Canada; a past president of the Toronto Board of Trade and of the Canada Bread Co.; and a director of Canadian General Investments, Ltd., Dominion Bridge Co., Ltd., and Montreal Trust Co.

Funeral services were held at Toronto on July 30.

Surviving are his wife and two sons, one of whom, Donald C., is treasurer of Goodyear-Canada.

Alfred G. York

AFTER a prolonged illness, death came July 22 to Alfred G. York at his home in Elizabeth, N. J.

Mr. York was a director and vice president of Watson-Stillman Co., Roselle, N. J. Shortly after joining the company in 1918 he became assistant treasurer—a position he held until his promotion as assistant to the president in which capacity he started and developed the distributer products division of the company. In 1941 he was elected vice president and general sales manager and in 1945 a director, at which time he took full charge of the distributers products division.

Mr. York belonged to the B.P.O.E., Society of the Plastics Industry, and American Petroleum Institute. He was also on the National Board for the Standardization of Fittings and was a member of the Manufacturers Standardization Society of the Valve & Fittings Industry.

His club memberships included the Suburban Golf Club of Elizabeth, and the Downtown Athletic Club, of New York.

NEWS ABOUT PEOPLE

R. A. Schatzel, vice president and director of engineering, Rome Cable Corp., Rome, N. Y., was elected to the board of directors of the American Society for Testing Materials at its annual meeting in Atlantic City, N. J., during the week of June 18. Mr. Schatzel has been particularly active in Committee D-11 on Rubber and Rubber-Like Materials, where he holds membership on several subcommittees, and for many years was chairman of subcommittee 5 on Insulated Wire and Cable.

Lorstan Studios

Clyde F. Hoover

Clyde F. Hoover has joined the technical staff of Pequanoc Rubber Co., Butler, N. J., as assistant director of research. Mr. Hoover has had many years of experience in the rubber industry and prior to joining Pequanoc was development manager of Essex Rubber Co., Trenton, N. J. Mr. Hoover is a member of the Division of Rubber Chemistry of the American Chemical Society, the New York Rubber Group, and the sole and heel technical committees of the National Production Authority, The Rubber Manufacturers Association, Inc. and the Rubber Heel & Sole Institute and is also a director of the Trenton Section, A. C. S.

W. B. Wiegand has resigned as vice president of Columbian Carbon Co., 41 E. 42nd. St., New York 17, N. Y., but will continue as a director and research consultant. The new arrangment will enable Mr. Wiegand to devote time to long-planned study and research outside the field of chemistry.

Ross Meekel

Ross Mekeel has been elected a director of Cameron Machine Co., 61 Poplar St., Brooklyn 2, N. Y. Purchasing agent for more than 25 years, he was named secretary of the company in June, 1948, and will continue as such.

George H. Goecke

George H. Goecke has been appointed sales engineer for Industrial Ovens, Inc., 13825 Triskett Rd., Cleveland 11, O. He will work under the direction of J. K. Gillett, sales manager, with company headquarters as his base of operations. Mr. Goecke was for 15 years a sales engineer for Ingersoll-Rand Co. and for the last year was a manufacturer's representative for Warren Steam Pump Co. Industrial Ovens designs and builds continuous processing equipment for the rubber, plastic, textile, paper, and wire industries.

Edward J. Strube, formerly with The Thermoid Co., has joined the research staff of Bishop Mfg. Corp., Cedar Grove, N. J., and will undertake development work in new dielectric tapes.

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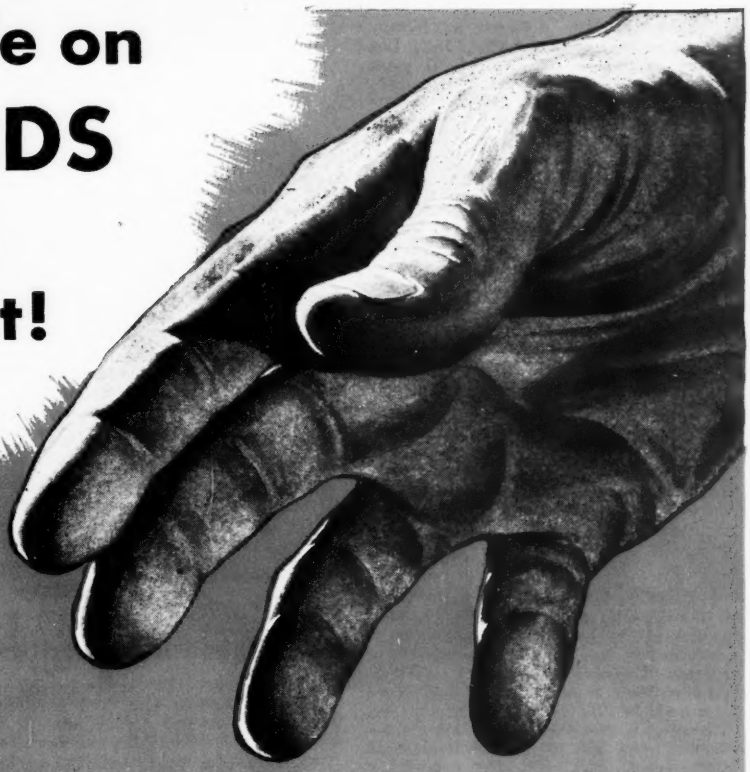

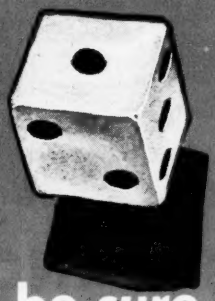

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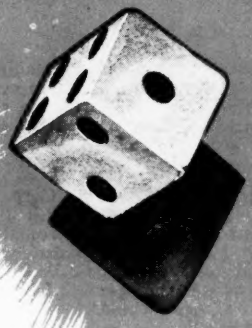

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Schibley & Ossmann, Inc., 33 Public Square, Cleveland 13, Ohio
Ecclestone Chemical Co., 2673 Guoin, Detroit 7, Michigan

R. A. Lees has resigned as factory manager of American Anode, Inc., Los Angeles, Calif., to become general plant manager of Automotive Rubber Co., Inc., Detroit, Mich., where he will have complete responsibility for operation of the company's new rubber mill and all processing departments under Automotive Rubber's general expansion program. Mr. Lees has more than 22 years' experience in the rubber industry. He started in Akron as a research chemist. Work in development, sales, and production followed, and he has long been closely identified with the Anode process of rubber dipping. In 1946 he became West Coast branch factory manager of American Anode. During World War II, Lees served as special consultant to the WPB Rubber Bureau and more recently to the NPA Rubber Division.

Stephen J. Geohegan is now vice president in charge of materials control for Industrial Tape Corp., New Brunswick, N. J. A director of the company since 1947, he most recently was director of the materials control division.

William F. Erath has joined the technical and sales staff of Whittaker, Clark & Daniels, Inc., 260 West Broadway, New York 13, N. Y., importer; manufacturer, exporter of minerals, colors and pigments. His experience in America's field of colors dates back to 1912 when his employer, the G. Siegle Co. of Germany, dry color manufacturer sent him to its branch plant in Staten Island, N.Y. He later operated a color laboratory and supervised sales work for Siegle in Chicago.

Frank Frey has been appointed factory representative in Georgia, Alabama, and Florida for Fremont Rubber Co., Fremont, O. Mr. Frey, who has wide experience in floor covering, will headquarter in Orlando, Fla.

L. Duke Golden has been appointed director of sales education on the administrative staff of The Dayton Rubber Co., Dayton, O., and will establish and conduct complete sales educational programs for all Dayton Rubber sales and service personnel and for the sales personnel of company distributers. Mr. Golden has more than 23 years' experience in selling, writing, and teaching.

Firestone Farm Tire

A pneumatic rubber tire has been developed by Firestone to replace the steel rimmed wheels of the farm planting machine. Made with a concave profile, the rubber tire molds the newly planted soil firmly against the seed, covers the fertilizer, and provides a uniform blanket of pulverized earth with its convex tread mark. Inflated to 10 pounds' pressure, the tire cushions the shock of hard soil clods, decreases dust while planting in dry soil, and goes through wet, early spring soils without the balling-up of ordinary steel wheels, it is further claimed. On rolling terrain the new tires will help keep the planted rows straighter and prevent sideslippage of the planting machine. Machines with steel wheels now in use can be converted easily to the new pneumatic tires.

CANADA

General Buys Stokes

The purchase of Joseph Stokes Rubber Co., Ltd., Welland, Ont., by The General Tire & Rubber Co. of Canada, Ltd., has been confirmed by W. O'Neil, president of the parent firm, The General Tire & Rubber Co., Akron, O. The new subsidiary will be known as the Stokes Division of The General Tire & Rubber Co. of Canada, Ltd. It is expected that there will be no changes in the operation or management of the Canadian company, but present production will be augmented with additional products now manufactured by General's mechanical goods division at Wabash, Ind. Present production at Stokes includes battery boxes, mechanical goods, plastics, and other soft and hard rubber products. Vincent P. Reid, executive vice president of General's Canadian subsidiary, will be in charge of the Stokes Division, and Lloyd J. Falkenhagen will continue in charge of operations.

Consolidating Activities

The manufacturing and sales activities of Panther Rubber Co., Ltd., and American Tile & Rubber Co. (Canada), Ltd., both of Sherbrooke, P.Q., and their United States affiliates are now being conducted under the name of the American Biltrite Rubber Co.

U. S. affiliated companies include Panther-Panco Rubber Co., Chelsea, Mass., American Tile & Rubber Co., Trenton, N. J., and Biltrite Rubber Co., Chelsea. All have been under the same ownership and management.

The company's trade names, "Biltrite" and "Panco" rubber heels and soles and "Amtico" rubber tile floor covering, remain unchanged.

Rubber Stocks, Output Up

Overall stocks of rubber in Canada on June 30—natural, synthetic, and reclaim—were 20% larger than a year earlier, but consumption during the month declined 10%, the Bureau of Statistics reported. Stocks of natural rubber rose 24%, and consumption fell 18%.

Stocks of natual rubber on June 30 totaled 5,471 tons, against 4,416 a year ago; synthetic, 3,285 tons against 3,278; and reclaim, 2,444 tons, against 1,599. Consumption of natural rubber amounted to 3,334 tons against 4,041; synthetic, 1,828 tons, against 1,817; and reclaim, 1,239 tons against 1,234.

The month's output of synthetic rubber was 4,504 tons, against 4,489 tons a year earlier, and production of reclaim advanced to 515 tons from 401 tons.

The Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., has informed the Montreal Stock Exchange that 263 shares of 4% cumulative redeemable sinking fund preferred stock have been redeemed and cancelled. There are 152,815 shares now outstanding.

Sponge Rubber Products, Ltd., a subsidiary of Sponge Rubber Products Co., Inc., Shelton, Conn., is building a $1,000,000 plant at Waterville, near Sherbrooke, P.Q. Plant should be completed and in operation this fall, turning out chemically blown sponge rubber. It is the company's first Canadian plant and will employ 100 to 150.

Gutta Percha & Rubber, Ltd., has opened new offices and warehouses in Montreal, Quebec City, and St. James, Man., to provide additional and more modern distribution for products of its Toronto, Ont., factory.

Canada Wire & Cable Co., Ltd., Leaside, Ont., in its recent semi-annual statement to shareholders reported, through President James Y. Murdoch, a continuing high demand for the company's products. Increased production has been made possible by the installation of new equipment and a larger staff. In the year ended June 30, 1951, 317 employes were added, making a total of 2,160. The new office and warehouse building in Calgary is now in use, and the new factory building at Leaside is expected to be ready for occupancy early in 1952.

FINANCIAL

American Cyanamid Co., New York, N. Y., and subsidiaries. Six months ended June 30: consolidated earnings, $22,690,449, equal to $5.80 a common share, compared with $12,468,785, or $3.47 a share in the 1950 half; net sales, $200,914,606, against $144,247,431.

American Zinc, Lead & Smelting Co., Columbus, O. First half, 1951: net earnings, $1,530,984, equal to $2.02 a common share, against $1,246,939, or $1.60 a share, a year earlier.

Baldwin-Lima-Hamilton Corp., Philadelphia, Pa. Six months ended June 30, 1951: net income, $2,007,713, equal to 42¢ each on 4,781,958 common shares, against $1,552,645, or 62¢ each on 2,375,298 shares, in the corresponding period of 1950: sales, $98,129,060, against $45,930,859.

Borg-Warner Corp., Chicago, Ill. Six months to June 30: net income, $11,594,588, equal to $4.83 a common share, compared with $15,779,074, or $6.62 a share, a year earlier; net sales, $201,832,434, against $152,740,274.

Brunswick-Balke-Collender Co., Chicago, Ill. Six months ended June 30: net income, $8,182, equal to 32¢ a preferred share, contrasted with $347,450, or 63¢ a common share, in the same months of 1950.

Lea Fabrics, Inc., Newark, N. J. Year ended May 31, 1951: net income, $672,408, equal to $3.20 a share, against $375,777, or $1.79 a share, in the preceding fiscal year.

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Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Belden Mfg. Co.	Com.	$0.40 q.	Sept. 9	Aug. 17
Brunswick-Balke-Collender Co.	Com.	0.25	Sept. 15	Sept. 1
	$5.00 Pfd.	1.25 q.	Oct. 1	Sept. 20
Canadian Tire Corp., Ltd.	Com.	0.30 q.	Sept. 1	Aug. 10
		*Stock	Sept. 1	Aug. 10
Collins & Aikman Corp.	Com.	0.25	Sept. 1	Aug. 17
Collyer Insulated Wire Co.	Com.	0.30	Aug. 1	July 20
Crown Cork & Seal Co.	Com.	0.50	Aug. 15	July 20
Electric Hose & Rubber Co.	Com.	0.30 q.	Aug. 17	Aug. 10
		0.70 extra	Aug. 17	Aug. 10
Endicott Johnson Corp.	Com.	0.40 q.	Oct. 1	Sept. 20
	4% Pfd.	1.00 q.	Oct. 1	Sept. 20
Firestone Tire & Rubber Co.	Pfd.	1.12½ q.	Sept. 1	Aug. 15
Flintkote Co.	Com.	0.50 q.	Sept. 10	Aug. 27
	$4.00 Pfd.	1.00 q.	Sept. 10	Aug. 27
Garlock Packing Co.	Com.	0.25 q.	Sept. 29	Sept. 14
General Motors Corp.	Com.	1.00	Sept. 10	Aug. 16
	$3.75 Pfd.	0.93¾ q.	Nov. 1	Oct. 8
	$5.00 Pfd.	1.25 q.	Nov. 1	Oct. 8
General Tire & Rubber Co.	Com.	0.50 q.	Aug. 31	Aug. 21
Goodyear Tire & Rubber Co.	Com.	†	Sept. 15	Aug. 15
Johns-Manville Corp.	Com.	0.75	Sept. 11	Aug. 27
Johnson & Johnson	Com.	0.25 q.	Sept. 10	Aug. 27
Lea Fabrics, Inc.	Com.	0.37½ q.	Aug. 31	Aug. 10
National Automotive Fibres, Inc.	Com.	0.50 q.	Sept. 1	Aug. 10
Philadelphia Insulated Wire Co.	Com.	0.60	Aug. 15	Aug. 1
Raybestos-Manhattan, Inc.	Com.	0.50	Sept. 12	Aug. 20
Seiberling Rubber Co.	Com.	0.25 q.	Sept. 10	Aug. 20
	5% Pfd. A.	0.25 q.	Oct. 1	Sept. 15
	4½% Pr. Pfd.	1.13 q.	Oct. 1	Sept. 15
A. G. Spalding & Bros. Co.	Com.	0.25 q.	Sept. 14	Sept. 7
United Elastic Corp.	Com.	0.60 q.	Sept. 10	Aug. 15
United States Rubber Co.	Com.	1.50	Sept. 10	Aug. 20
	Non-Cum. Pfd.	2.00	Sept. 10	Aug. 20
U. S. Rubber Reclaiming Co.	$1.40 Pfd.	0.35 q.	Oct. 1	Sept. 21

*A stock dividend of one 5% ($20 par) preference share for each common share held.
† Seventy-five cents per share. (Cash dividend will also be paid on stock dividend.) Ex-dividend $1.50 per share on Aug. 13, 1951.

Anaconda Wire & Cable Co., New York, N. Y. First half, 1951: net income, $3,120,776, equal to $3.70 a share.

Belden Mfg. Co., Chicago, Ill. Six months ended June 30: net income, $619,928, equal to $1.93 a share, against $750,893, or $2.34 a share, in the 1950 half.

Brown Rubber Co., Inc., Lafayette, Ind. First six months, 1951: net income, $652,135, equal to $1.73 a share and 15% higher than the 1950 months' figure.

Canada Wire & Cable Co., Ltd., Leaside, Ont., Canada. First half, 1951: net profit, $1,282,000, against $1,003,000 in the first half of 1950.

Philip Carey Mfg. Co., Cincinnati, O. First six months, net income, $1,702,756, equal to $2.07 a common share, compared with $1,399,509, or $1.69 a share, in the previous year's half; sales, $28,761,609, against $20,976,915.

Columbian Carbon Co., New York, N. Y. First half, 1951: net income, $2,823,275, equal to $1.75 a common share, compared with $2,930,524, or $1.82 a share, in last year's half; sales, $25,802,103, against $22,721,520.

Crown Cork & Seal Co., Inc., Baltimore, Md. Half ended June 30: net income, $2,191,404, equal to $1.59 a common share, against $717,352, or 37¢ a share, in last year's half.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. First six months, 1951: net income, $112,852,042, equal to $2.50 a common share, compared with $116,629,075, or $2.59 a share, in the 1950 half; net sales, $769,988,778, against $580,888,994.

Dow Chemical Co., Midland, Mich. Year ended May 31, 1951: net earnings, $41,334,744 (a new high), equal to $6.12 a common share, contrasted with $33,813,105, or $5.73 a share, in the same period in 1950; sales, $339,588,268 (another record), against $220,830,183; taxes, $68,200,000, against $19,500,000.

Flintkote Co., New York, N. Y. Twenty-eight weeks to July 14: net income, $3,139,602, equal to $2.35 a common share, against $3,123,007 or $2.33 a share, in the 1950 peroid; net sales, $46,909,643, against $37,848,877.

Garlock Packing Co., Palmyra, N. Y. First half, 1951: net income, $950,982, equal to $2.27 a share, against $669,194, or $1.59 a share, in last year's half.

General Cable Corp., New York, N. Y. First half, 1951: net income, $2,693,789, against $727,000 in the first half of 1950.

General Motors Corp., Detroit, Mich. January 31-June 30, 1951: net earnings, $274,000,000, equal to $3.13 a common share, compared with $485,000,000, or $5.45 a share, in the 1950 half.

Glidden Co., Baltimore, Md. Nine months to May 31: net earnings, $5,840,220, equal to $2.77 each on 1,971,623 common shares, against $4,557,172, or $2.14 each on 1,965,775 shares, a year earlier.

Koppers Co., Inc., Pittsburgh, Pa. First six months, 1951: net income, $5,035,239, equal to $2.93 a common share, against $5,168,506, or $3.01 a share, in the like period of 1950.

B. F. Goodrich Co., Akron, O. and subsidiaries. Initial half, 1951: net income, $16,176,202, equal to $3.79 a common share, compared with $12,427,793, or $2.92 a share, in the corresponding period last year; net sales, $322,175,790, against $231,612,854.

Goodyear Tire & Rubber Co., Akron, O., and subsidiaries. First half, 1951: net profit, $20,685,820, equal to $9.32 a common share, compared with $11,914,465, or $5.08 a share, in the 1950 period; net sales, $544,642,341, against $344,887,654.

Intercontinental Rubber Co., Inc., New York, N. Y., and subsidiaries. Half ended June 30: net profit, $253,649, equal to 42¢ a share, contrasted with net loss of $130,053 in the 1950 period; sales, $905,108, against $121,581.

Johnson & Johnson, New Brunswick, N. J. First half, 1951: net income, $5,219,000, equal to $2.45 each on 2,090,123 common shares, compared with $5,567,000, or $2.70 each on 1,988,428 shares, in the preceding year; sales, $99,929,000, against $71,983,000.

Mansfield Tire & Rubber Co., Mansfield O. First six months, 1951: net profit, $1,588,082, equal to $9.77 a share, compared with $633,937, or $3.87 a share, in the 1950 half; sales, $38,060,391, against $17,564,263.

Minnesota Mining & Mfg. Co., St. Paul, Minn. First half, 1951: net earnings, $7,951,939, equal to $1.00 a common share, against $8,816,389, or $1.11 a share, a year earlier; sales, $85,850,163 against $65,577,460.

National Lead Co., New York, N. Y. Six months to June 30: net earnings, $12,961,777, equal to $3.51 a common share, against $12,578,051, or $3.43 a share, in the 1950 half.

New Jersey Zinc Co., New York, N. Y. Initial half, 1951: net profit, $5,495,028, equal to $2.80 a share, compared with $2,417,848, or $1.20 a share, in the like period last year.

Pittsburgh Plate Glass Co., Pittsburgh, Pa., and subsidiaries. Initial half, 1951: net income, $19,479,859, equal to $2.16 a share, compared with $19,358,325, or $2.14 a share, in the previous year's half; sales, $211,752,642, against $152,011,702.

United Engineering & Foundry Co., Pittsburgh, Pa. Six months ended June 30, 1951: net income, $1,933,944 equal to $2.33 a common share, compared with $3,422,625 or $4.14 a share, in the corresponding period of 1950, net sales $29,363,816, against $36,489,448.

United States Rubber Co., New York, N. Y. First six months, 1951: net earnings, $16,427,189, equal to $7.85 a common share, contrasted with $8,848,757, or $3.55 a share, in the corresponding period last year; net sales; $427,714,511, against $291,278,706.

(*Continued on page* 758)

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McNeil Hydraulic Bag-O-Matic Diaphragm Curing Press Showing Press near End of Opening Cycle; Cured Bag and Core of Top Half Mold May Be Seen; Power Unit and Controls on Right of Press

Bag-O-Matic Diaphragm Curing Press

ONE of the most important factors in the automatic molding and curing of tires in the McNeil Bag-O-Matic tire press[1] is in the compounding, molding, and cutting of the tire bag. McNeil Machine and Engineering Co., Akron, O., has designed and built a special hydraulic transfer press for the manufacture of the bags used with Bag-O-Matic tire curing processes, and this transfer press is known a the hydraulic Bag-O-Matic diaphragm curing press.

The bag curing press is of the "deep well" type, and the portion of the mold which receives the uncured bag stock is

[1] India RUBBER WORLD, Apr., 1950, p. 98.

Team Work!

SEE PAGE 642

3 Ideal Reds for Natural or Synthetic RUBBER

MAPICO

COLUMBIAN CARBONS

RED 297
Strong Color on the Orange Side

RED 347
Darker Mass Tone—Blue Cast

RED 387
Still Darker Mass Tone—Bluer Cast

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- Good aging behavior
- Moderate reinforcement
- Spheroidal particle shape
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- High quality innertubes
- Footwear
- Rubber hose
- Drug items
- Sundries and
- Chemical goods

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Results—a finer, more flexible hose with better adhesion, at a lower cost than braided hose.

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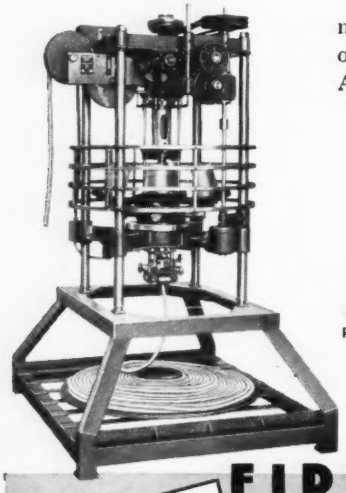

MODEL D-25
FIDELITY VERTICAL HOSE REINFORCEMENT MACHINE

Manufacturers of intricate precision machinery since 1911.

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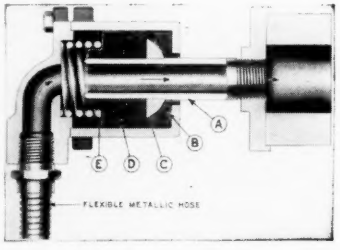
located in the bottom half of the mold proper. The top half mold is constructed so that one portion becomes a transfer piston when the two halves of the mold are mated. During the closing of the press the stock is forced, or transferred, from the piston and cylinder assembly into the actual cavity.

When the press begins its opening cycle, the bag is first stripped free from the top half mold. During this period the core is moving downward with the bottom half mold until the core reaches its maximum extension. At this time the stripping operation begins which removes the finished bag from the core. At this point the bag is still in the bottom half mold. The operator then presses a foot-valve which actuates the movable lower ring assembly. This lower ring extends vertically and strips the molded bag from the bottom half mold. The bag is then buttonholed off the movable ring, which is lowered, and the press is then ready for reloading.

New Rotary Pressure Joints



Sectional View of Johnson High Pressure Rotary Joint, Showing (A) Nipple Connected to Roll; (B) Carbon-Graphite Seal Ring; (C) Nipple Collar; (D) Support Guide; and (E) Spring

SELF-SUPPORTING Type S Johnson rotary pressure joints are now being made by Johnson Corp., Three Rivers, Mich., in heavy-duty construction suitable for operating pressures up to 250 pounds. The Type S joint is widely used in rubber, textile, and papermaking mills and in other applications requiring the admission of heating or cooling agents to rotating rolls. The Type S is a specialized variety of the standard Johnson rotary joint that was developed to combat the threat of misalignment on machines such as calenders where considerable lateral movement of rolls is encountered. Previously limited to a maximum operating pressure of 150 pound, the new high-pressure design makes the Type S joint available for much wider application.

The new joint retains the packless, self-lubricating, and self-adjusting features of the regular Johnson joint. The rotating member consists of one part, a nipple connected directly to the roll or drum. This nipple has a convex, hemispherical collar that rotates against a matching concave surface of a carbon-graphite seal ring. Pressure acts as the sealing force to hold the seal ring against the collar. A spring is provided only for initial seating. The rear portion of the nipple serves as a bearing surface and rotates in a large carbon-graphite guide fitted inside the body. This construction supports the joint and permits it to shift with the roll, preventing any danger of misalinement.

The Type S joint, available for either through-flow or syphon pipe service, is made in sizes from ¾-3 inches. Head lugs are provided for simple stop rods to keep the joints from turning.

Sweden's Synthetic Rubber; *Kok-saghyz*

SWEDISH reports indicate that the Institute of Technology, in Stockholm, after three years of experimentation and research has made synthetic rubber from cellulose spirits produced by the sulfite mills here. It is added that further tests have shown that the lignin residue from cellulose manufacture is a highly suitable filler for this new rubber, conferring added strength, and that it can be used to replace carbon black. Apparently a promising new use is in sight for the substantial amounts of alcohol produced by the Swedish sulfite mills, of which only about one-third has hitherto been utilized by the domestic chemical industry.

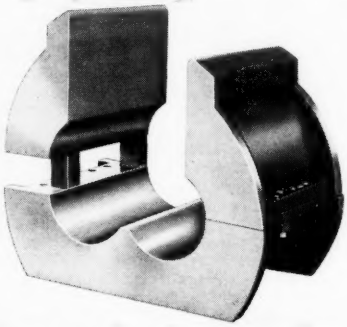
According to the foreign press, Trelleborg Rubber Co., which has for some time been conducting tests with rubber from locally grown *Kok-saghyz* (the Russian dandelion), recently produced the first tire from this material. The *Kok-saghyz* seeds, brought from Russia in the 1940's, were planted in the nurseries of the Svalov Botanical Station where they have thriven very well, for it is claimed that the plants obtained here are three times as large as those in Russia. The rubber is reportedly of good quality, but costs of production are still rather high.

For Processing Plastics, Rubber, Asphalt Tile

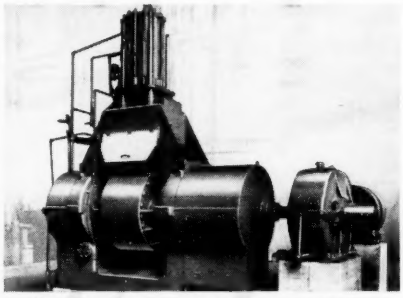
and Similar Materials . . .

Specify Struthers Wells

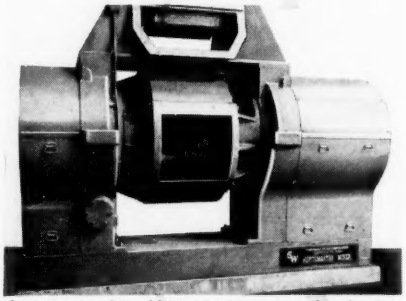
INTENSIVE MIXERS!



New Three-Piece Trough, easily removable, provides minimum down time for repair or replacement. Left side is blocked up to show flanged construction.



No. 30 Intensive Mixer in operating position—used for breakdown of rubber. Capacity: 165 lbs. crude rubber.



Close-up view of No. 30 Intensive Mixer, rotated to cleaning and inspection position. Will rotate to discharge directly downward.

Struthers Wells Intensive Mixers are ideal for processing plastics, rubber, asphalt tile and other materials difficult to process or of an abrasive nature. Mixing is accomplished by a pair of parallel rotors. The material is confined by a compression ram which provides intensive working action for rapid breakdown and mixing of the batch. The trough, ram and rotors permit heating or cooling as required.

The main rotating elements of the machine are contained in one integral and rugged barrel unit, which is set in trunnion stands. The mixing chamber is open only at the top, and does not have a gate or valve in the bottom. It is water-tight, and compounding oils may be placed in the mixer first if desired.

The machine is charged from the top into the mixing chamber. The cross section of this chamber is UU-shaped. For discharging, the mixing chamber is rotated until it approaches an inverted position. For cleaning and inspection it is placed in a horizontal position. A wide opening makes the chamber very accessible.

The design and construction of Struthers Wells Intensive Mixers—backed by years of research and progressive improvement—is your assurance of the ability and versatility of our engineers and craftsmen to meet your specific mixing requirements, regardless of how different or difficult they may be.

Struthers Wells

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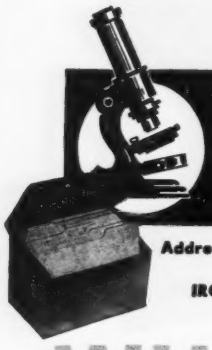

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EUROPE

GREAT BRITAIN

RGA Meeting and Election

At the ordinary general meeting of the Rubber Growers' Association held in London, April 30, A. P. Hamilton, chairman of Orient Trust, Ltd., and director of various rubber estates, was elected chairman, and Sir Sydney Palmer, vice chairman, for the ensuing year.

The retiring chairman, H. B. Egmont Hake, in reviewing the situation, spoke of the overnight change in the fortunes of the rubber industry following the North Korean aggression, emphasizing the widespread benefits of the rise in price. He said in part:

"It has been a major factor in enabling Great Britain to suspend Marshall Aid; it has lifted the Malayan Treasury from stringency to comfort, and, after their Export Duty grab, to opulence; it must have helped, if anything could help, to save Indonesia from collapse, if not from anarchy; it has added strength to the reserves of rubber companies, heavily depleted by the vast unrecompensed expenditure . . . to achieve their great comeback to all-time high records of production; it has turned hundreds of thousands of peasant owners into small capitalists, the surest safeguard againt the agitator. Indeed, all growers, large and small, have at last breathed freely for the first time in a quarter of a century."

The improvement in price inevitably is being accompanied by inflation in costs of production which will be difficult to adjust later if a serious decline in rubber price sets in, he went on, and added the hope that there would be definite assurance that the tonnage now being bought for the American stockpile would be retained as such indefinitely. As to the internal situation in the rubber countries in the Far East, though still tranquil in India, Burma, and Ceylon, it was very disturbed elsewhere.

"But the troubles in Malaya," he thought, "are not an isolated phenomenon; they are linked with other events in the Far East; and external events have a vital repercussion on the degree of confidence among the Malayan people in the general outcome. Nothing less than a Pacific Pact covering the whole of South East Asia is likely to remove their hesitations."

The speaker also found the situation in Indonesia worse than it was a year ago; on the other hand some progress had been made in Indo-china under a new and more liberal policy toward building up more indepenent institutions, and this disposal of the idea that the new states were mere puppets of French colonialism had encouraged a national stand against the Communists.

He spoke of the changes brought about by the transfer of power in the Far East and of the need of effective representation on the spot and of cooperation with Asians; he also cited the Rubber Producers' Council of Malaya, formed some months ago, in which all categories of rubber producers, European and Asian are represented, sitting around the same table, as an example of "the pattern of the new citizenship."

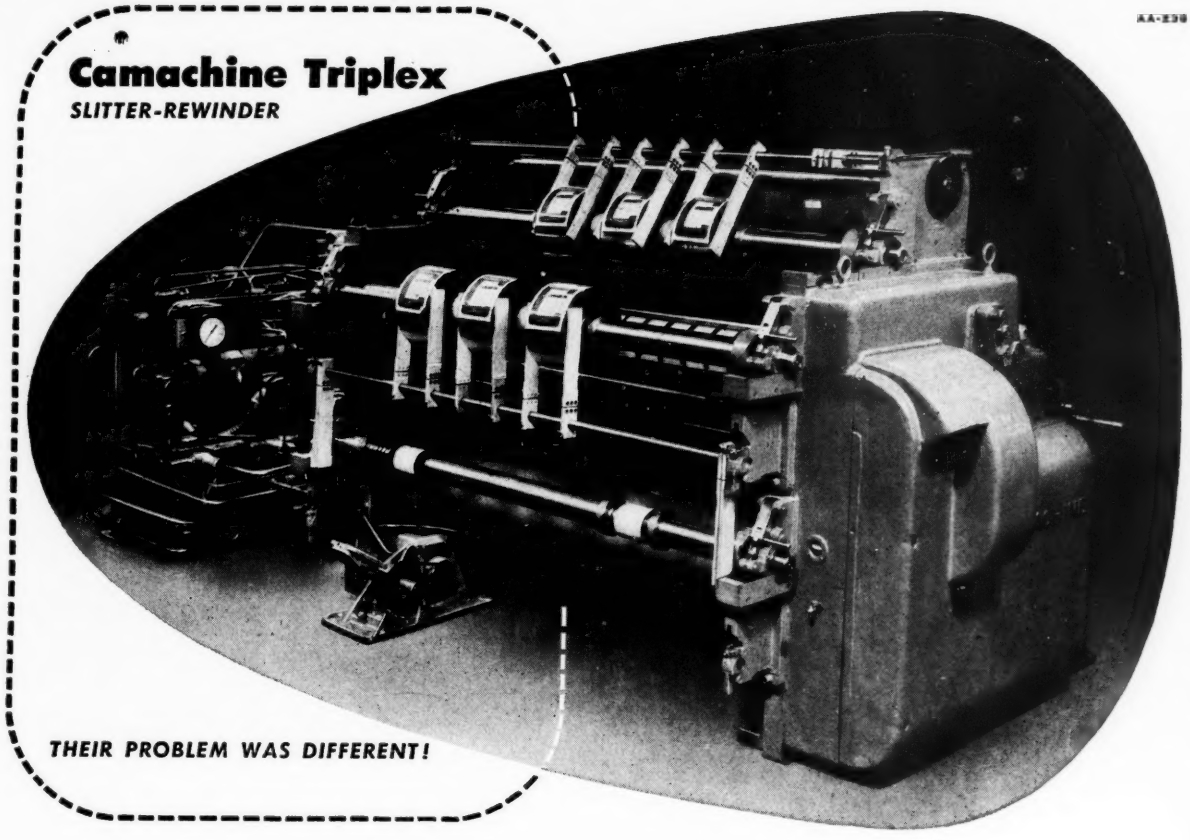
How FBRMA Helps the Rubber Industry

How the Federation of British Rubber Manufacturers' Associations helps the rubber manufacturing industry is revealed in the review of the organization's activities during 1950, presented by the retiring president, Thomas H. Redfern. He stated that the number of operatives rose from 98,600 on January 1, 1950, to 108,100 on January 1, 1951; while consumption of natural rubber increased from 184,255 tons during 1949 to 219,668 tons in 1950, and that both employment and consumption had continued the upward trend in the early months of 1951.

A matter of great concern is supplies of raw materials, and the Federation has discussed the need of stockpiling and the advisability of synthetic rubber production in Britain. The Federation has direct representation on the Materials Supply Committee and on the main Defence Committee of the Federation of British Industries; it participates in the work of the latter through representation on the Grand Council, Contract Committee, Overseas Trade Policy Committee, and Home Publicity Committee. Acting through an Export Committee, the Federation of British Rubber Manufacturers' Associations presses the interests of the rubber industry in the export field, and Mr. Redfern referred to the fact that the export of rubber goods rose 64% in the six months ended February, 1951, over the comparable period of the previous year, a result which was due

AA-238

Camachine Triplex
SLITTER-REWINDER



THEIR PROBLEM WAS DIFFERENT!

when you must depend on experience . . .

A large producer of acetate film ordered a battery of high-speed slitter-rewinders to use in processing their product. Characteristics of the material called for highly sensitive web tension control throughout the slitting and rewinding operation, and for razor-clean slitting. Provision had to be made for producing rolls of uniform density regardless of variations in the caliper of the material. Since core heat would ruin the inner laps of the rewound rolls it was necessary to minimize heat generated by friction between core and rewind shaft. Other requisites included: positive roll separation; trim rewind for salvage; 15″ diameter rewind and speed of 800 feet per minute. And no complicated gadgets — the machines had to be designed for economy, simplicity, durability and low-cost maintenance.

. . . you can depend on Camachines®

The new Camachine Triplex slitter-rewinder was specifically developed to meet the requirements outlined above. The Triplex is a *new* machine, designed to meet a *new* set of operating conditions, and featuring several *new* principles in slitter-rewinder engineering. The Triplex is *new,* yes, but its design is deeply rooted in Cameron Machine Company's sixty years of specialization and leadership in the manufacture of roll production equipment. The new Triplex has proved again that when you have to depend on experience you can depend on Camachines!

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not only to increased costs, but also to an appreciable increase in volume.

An important part of the work of the Federation's technical committee is in connection with the preparation and publication of specifications by the Rubber Industry Standards Committee of the British Standards Institution, and during the year the British Standard "Methods of Testing Vulcanized Rubber," known as BS 903, was published, and also the first part of BS 902, dealing with the testing of latex products.

The retiring vice president, J. H. Lord, has been elected president to succeed Mr. Redfern. Mr. Scott, who joined the Dunlop Rubber, Ltd. in 1927, has been a director of the main board of the concern since 1947.

The substantial increase in exports of practically every line of rubber manufacturers booked by Britain in 1950 was revealed when statistics of Britain's rubber goods trade for that year became available. That the upswing has been continuing in 1951 is clear from monthly figures released. Except for February, when exports of various goods, particularly tires, declined below the level of the preceding month and even of December, 1950, each month from the beginning of the current year through May established a new record.

The comparative figures for all of 1950 and 1949, and in a separate table, monthly totals for various classes of goods exported during the first five months of 1951 are shown in the tables below:

	1950		1949
	Quantity	Value	Value
Tires for:			
Aircraft ..... *no.*	20,778	£298,086	.....
Heavy motor vehicles	913,312	11,235,388	.....
Other motor vehicles	1,220,747	4,369,556	.....
Motor cycles and tricycles	139,170	199,442	.....
Cycles	3,582,446	854,190	.....
Total value		£16,956,662	£12,500,407
Inner tubes for:			
Cycles, motor cycles, and tricycles ..... *no.*	2,504,335	£278,952	.....
Other motor vehicles	1,390,936	1,111,336	.....
Total value		£1,390,288	£1,177,649
Products classed as rubber manufactures		£8,496,099	£6,058,813
Belting ..... *tons*	57,815	1,873,800	1,480,880
Footwear items incorporating rubber ..... *doz. pr.*	478,577	2,100,527	1,125,941
Golf balls ..... *doz.*	244,014	254,405	216,614
Tennis balls ..... *doz.*	277,061	230,984	156,850
Rubber-proofed and other mackintoshes and oilskins .... *no.*	1,936,379	2,969,447	2,415,031

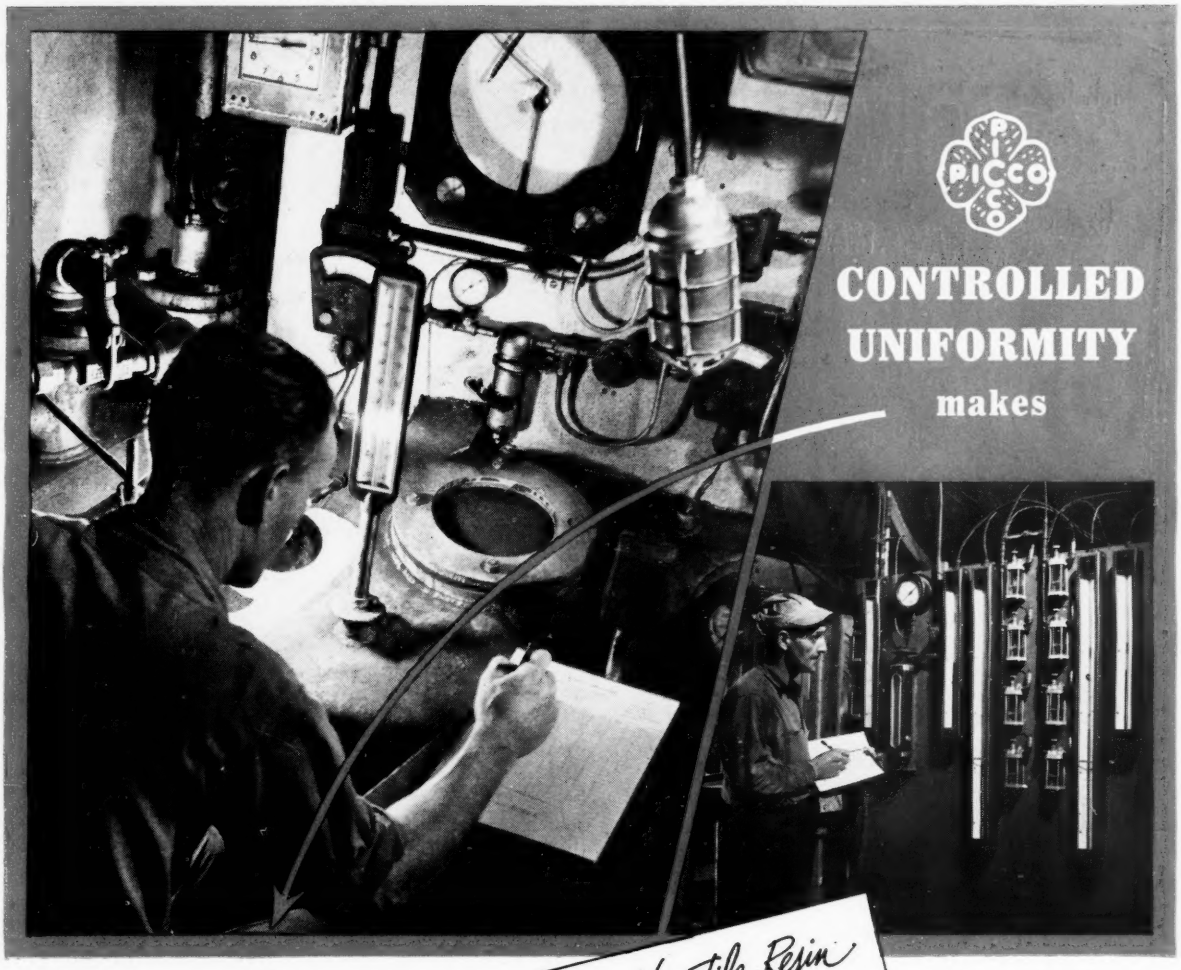
VALUE OF MONTHLY EXPORTS IN £ STERLING

	(1951 Months)				
	Jan.	Feb.	Mar.	Apr.	May
Tires	1,940,324	1,749,417	2,123,610	2,637,417	2,961,872
Inner tubes	143,640	134,744	178,572	215,811	260,104
Products classed as rubber manufactures	1,041,937	880,565	975,216	1,176,024	1,245,770
Belting	203,314	202,719	190,509	292,550	253,839
Footwear items	299,753	128,364	264,738	251,182	321,251
Golf balls	30,876	25,292	31,053	52,392	27,049
Tennis balls	22,286	26,736	49,876	47,488	38,002
Rubber-proofed and other mackintoshes, oilskins	309,187	274,339	309,327	334,888	355,868

More Rubber Chemicals Coming

The Board of Trade and the treasury have approved plans for doubling the output of the carbon black plant which Cabot Carbon, Ltd., built at Ellesmere Port, Cheshire, and which has been operating since July, 1950. Total productive capacity would thus be raised to 40 million pounds a year, permitting exports to other parts of the Commonwealth. Construction of the new unit, which will produce chiefly high abrasion grades of carbon blacks, may require at least a year. Eventual additional finance will reportedly be provided by the parent company in America, Godfrey L. Cabot Inc., Boston, Mass. The Philblack O plant of the carbon black plant of Philblack, Ltd., Avonmouth, started production early in May. The Philblack A plant should be ready soon.

New allocation schemes for the distribution of sulfur and sulfuric acid have been introduced by the Board of Trade which, it is hoped will insure that consumers receive at least as much of these materials as they have been getting since the beginning of the year. It is understood that the rubber industry will be allocated 90%, calculated on the basis of consumption in all of 1950, against 85% of the monthly average during the period April to September, 1950, inclusive, that it obtained in the first quarter of 1951.



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PICCOLYTE is a versatile resin, having properties that make it ideally suited for a wide variety of products.

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Trade Notes

P. B. Cow & Co. has acquired the fixed assets and trade marks of Peradin, Ltd., now in voluntary liquidation. Peradin, which manufactured rubber goods and also specialized in rubber-to-metal bonding, was incorporated in 1930 with authorized capital of £75,000. It operated successfully until 1948, after which a combination of lessened demand for certain goods, new sales taxes, and rising costs, of raw materials and machinery caused difficulties.

On May 25, 1951, the foundation stone of the National College of Rubber Technology was laid by the Minister of Education. The building, adjacent the Northern Polytechnic, London, is expected to be ready for occupancy by September, 1952.

According to *British Plastics*,[1] Britain's exports of plastics have increased from 13,000 tons in 1946 to 35,000 tons in 1950. This growth is partly explained by the fact that the shortage of dollars has led many countries to turn from the United States to Britain for their supplies of synthetic resins, molding powders and sheets, foils, rods, and tubes. Australia heads the list of importers of these goods from Britain; other customers include Denmark, Netherlands, Sweden, New Zealand, Union of South Africa, and India.

[1] 24,63 (1951).

GERMANY

Production of Buna Again Permitted

Now that the ban on the manufacture of Buna has been lifted, the question is how soon will factories be able to start operations, and how much will they be able to produce to begin with. Of the three important factories in Western Germany, only the Chemical Works in Huels, Ruhr, will be able to operate this year, although it is said that it will take about five months to rehabilitate the factory, idle since the end of the war. The factory at Ludwigshafen in the French Zone was so badly damaged that it will require two or three years to put it in working order again. The Bayer works in Leverkusen (Ruhr) is in better shape; but when it could begin to produce again could not be ascertained.

In view of the lack of capital for rehabilitation and the shortage of coal, large amounts of which are required for butadiene production, estimates of initial outputs at any rate have perforce to be conservative.

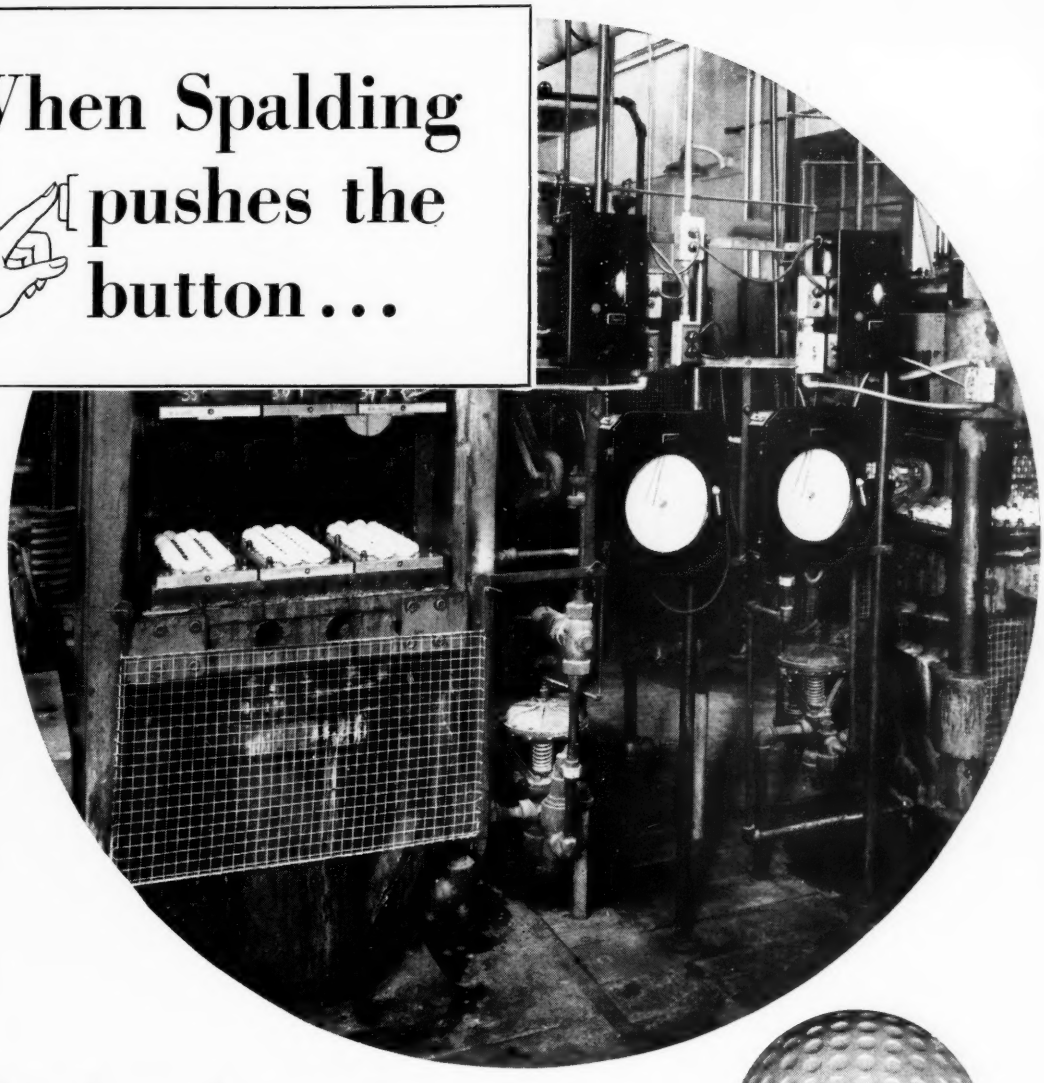
When the war ended, the factory at Huels was said to be capable of producing about 3,100 tons of butadiene and 4,600 tons of Buna a month. Now the plant is not expected to produce more than 500 tons of butadiene a month in the early stage of development; in the next stage, it is planned to use a new method for making butadiene (not needing coal or electricity, it is said), and monthly output of 1,800 tons of butadiene and 1,800 tons of Buna are expected. Part of the butadiene will apparently be diverted to the Leverkusen plant for conversion into Perbunan.

German Trade Notes

Among recent new developments reported is an elastic coupling having rubber masses ("packets") in the coupling disk, in which use is made of polished cylindrical bolts instead of the usual unfinished claws on the reverse plate. Machines are coupled simply by slipping the bolts into the space between the rubber packets; no screwing is said to be necessary.

At the International Automobile Show held again for the first time after an interval of 12 years at Frankfurt a. M., Harburger Gummiwaren-Fabrik Phoenix, A.G., Continental Gummi-Werke A.G., and Haguma Hannoversche Gummifabrik, G.m.b.H., all showed applications of rubber-to-metal springs. Phoenix demonstrated the use of metal-to-rubber packets as connections between axles and chassis of a trailer, instead of the usual leaf springs. In collaboration with the Osnabruck Steel Works, Phoenix has also developed metal-to-rubber disk springs for wheels of oversize street cars for the Hamburg Elevated Railway Co. Here a steel disk is attached on each side of the hub, and to the inside of each of the two disks is vulcanized a rubber ring, which in turn is bonded to another metal ring. Both the inside metal rings are secured to a T-shaped ring which carries the actual wheel rim. The construction aims at reducing lateral shock as well as damping noise and reducing vertical dynamic forces on vehicles and rails.

When Spalding pushes the button...



...Taylor keeps its eye on the ball!

Taylor's Centennial ACCURACY FIRST SINCE 1851

WHEN the A. G. Spalding Company cures golf balls at its Chicopee Falls, Mass., plant, they start each press by pushing just one button. From then on, a Taylor FLEX-O-TIMER* Time Cycle Controller takes over and regulates the sequence and duration of all press operations. Here's what happens:

1. Hydraulic valve opens, applying pressure to close press and hold it closed.

2. Simultaneously, steam is turned on for heating press platens, and timing of curing cycle begins.

3. At end of timed curing cycle, timer shuts off steam and opens water valve to cool platens.

4. At end of cooling cycle, water is shut off, hydraulic pressure valve is closed and press opens.

5. Throughout entire process, a Taylor Two-Pen Recorder makes permanent chart record of both platen temperature and platen pressure.

Result for Spalding: identical cures, time after time, with minimum rejects, minimum operator attention . . . a tremendous saving in time and money.

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Dr. Kurt Herberts & Co., Wuppertal, has made an agreement with the British company, Styrene Co-Polymers, Ltd., whereby the former is given sole manufacturing rights for Germany and Austria of the styrene copolymer products marketed as Scopal, Scopac, and Scopatrex. The English concern has been jointly established by a German group and Petro-Chemicals, Ltd., and the products involved were developed by members of the German group.

The technical-scientific Dechema Information Meeting, 1951, was held in conjunction with the annual session of the Chemical Engineering Committee of the Association of German Engineers in Frankfurt a.M., May 27 to 30. About 50 papers on chemical plant and engineering topics were presented by well-known experts, including several from foreign countries. The lectures were followed by discussions held in small groups as well as in full assembly.

The Rubber Foundation is understood to be planning shortly to establish a branch also in Germany.

G. Raffenbeul, Schwelm, has devised an apparatus for attaching rubber soles to leather in which quick drying is achieved by infrared heating.

Phrix G.m.b.H., Hamburg, is marketing a new transparent wrapping material, Phriphan, said to be unusually strong, impermeable to odors, oils, fats, bacteria, dust, and dirt. The material is supplied in various thicknesses and can be glued together or welded, according to type. It is especially recommended as wrapping material for surgical and sanitary rubber goods, bandages, and other hospital requirements.

ITALY

Italy's rubber industry is reportedly expanding at a rapid rate, and output for 1951 is expected to reach about 100,000 metric tons, against the record 1950 total of 75,000 tons. Available production figures for 1950 cover the first 11 months and came to 68,440 metric tons, or 15% more than in 1949. Since the industry was operating at about 90% of capacity during 1950, therefore, what with the construction of new plants and modernization of existing facilities, the increase in output of about 30% envisaged for 1951 is at least physically possible. In some quarters it is suggested that an increase of as much as 40% could be attained if necessary. Output in 1950 not only covered all home requirements, but permitted exports of about 15% of total sales so that it is obvious that a large part of the 1951 increase could be devoted to military purposes without seriously affecting even increased civilian consumption. Of the 1950 production, automobile tires and tubes accounted for about 60%, against 56% in 1949; technical articles represented about 22%; and cycle tires, footwear, soles, heels, and other rubber goods, the rest.

Operation in Italy's chemical industry was also on a high level for most products including plastics and synthetic resins, output of which had been stimulated by shortages in certain raw materials. The plastics industry is said to have a production at least four times as great as prewar, which is growing steadily. Because of the uncertain outlook for imports of most synthetic organic chemicals, considerable attention is being given to the manufacturer of a full-line of petroleum chemicals.

The business report of the Pirelli concern, Milan, reveals various proposals for expansion: 500,000,000 lire are to be placed in a special fund for renewal of equipment; a new tire factory is to be erected in Turin; a merger with the Superga company is under consideration, in which Pirelli would take over all the works of Superga except the footwear factories.

FINLAND

Finland is one of several countries whose attempts at expanding the rubber industry are being hampered by high prices of raw materials. In 1950 this nation had been able to increase production substantially, but no further advances are expected in 1951; in fact output of cycle tires may have to be cut back close to the 1949 level. Production last year included 70,000 automobile tires and 80,000 tubes, against 42,000 and 44,000 units, respectively, in addition to 600,000 cycle tires and 560,000 tubes, against 370,000 tires and 480,000 tubes in 1949. The industry also manufactured 3,600,000 pairs of rubber shoes in 1950, against 3,300,000 pairs the year before. Last year consumption of crude rubber was about 4,700, against 3,600 tons in 1949. Requirements for 1951 were put at 5,000 tons, but it is not considered likely that they will be met.

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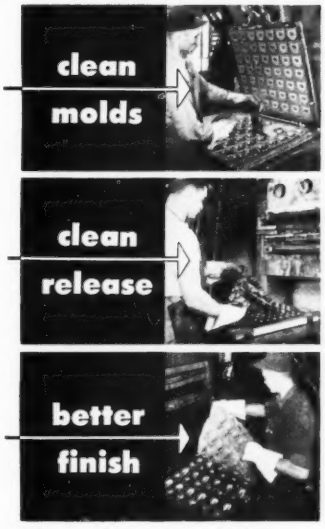

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FAR EAST

MALAYA

Government Plans for Rubber

The government's stabilization plan for rubber has succumbed to attacks from various quarters. It was denounced as a possible step toward nationalization and was warned against as dangerous interference likely to discourage overseas investments urgently needed to develop the country.

A broadcast suggesting nationalization as the alternative, if the plan were not accepted, and shown to have been approved by a government official was branded as a mixture of lies and half-truths calculated to inflame Asiatic hearers who had been given the impression that producers were public enemies against whom nationalization was the only remedy.

The government first modified its stand to the extent of shifting emphasis to the need of replanting and for a replanting fund; it showed that of a total planted area of 3,364,000 acres, a little more than 200,000 acres had been replanted in the 10 years since the beginning of World War II, and it claimed that $100,000,000 (Straits currency) would be required for smallholders alone. The Rubber Growers' Association of London, in reply, pointed out that the 10-year period mentioned included the war years when progress was interrupted; while in the postwar years the rehabilitation period, the rise of terrorism (in 1948), and now the high cost and scarcity of labor retarded planned developments. Companies however, are continuing to set aside substantial amounts as planting reserves. Business reports issued since the beginning of 1951 show that 125 companies with aggregate profits of £5,781,000 (after tax allowance) have put into general reserve £1,589,000 and into replanting reserve, £1,184,000. Furthermore, government figures have not taken into account 127,316 acres of new planting, which brought the total area of high-yielding rubber in Malaya to 536,618 acres, or 27.2% of the total planted area.

The following figures (in acres) of new planting and replanting were submitted:

	New Planting	Replanting	Total
1939	92,473	36,282	128,755
1940	19,884	49,033	68,917
1941	*	*	*
1942×	.....	.....	.....
1943×	.....	.....	.....
1944×	.....	.....	.....
1945×	.....	.....	.....
1946	*	6,664	6,664
1947	1,370	24,840	26,210
1948	6,623	45,542	52,165
1949	6,966	52,888	59,854
	127,316	215,249	342,565

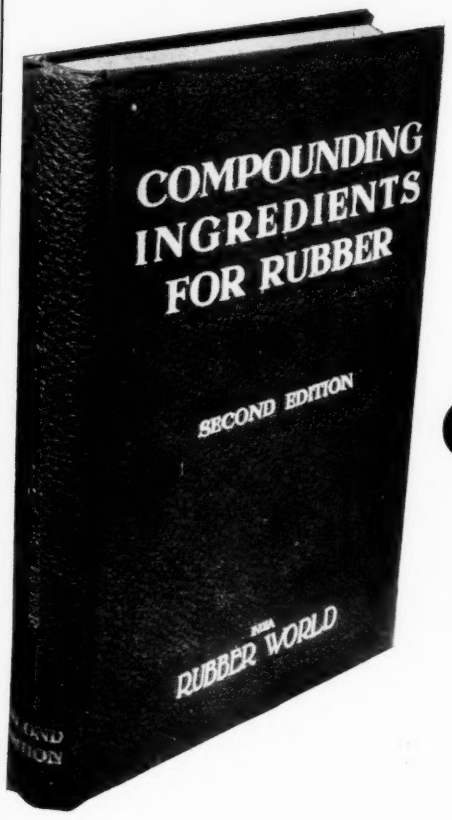
* No figures available.
× Japanese occupation.

The government has made no new proposals for a replanting fund.

On the other hand a scheme to compel smallholders to save $5 per picul (about 133 pounds) of rubber sold for replanting purposes is to be discussed. Representatives of the smallholders on the Rubber Producers' Council have recommended that when the price of rubber is above $100 per picul, $5 bonds should be issued by dealers for every picul bought by them. The bonds would be transferrable among smallholders under certain conditions and redeemable one year after date of issue. The holder would do replanting or new planting with approved material under qualified supervision. This method was suggested as an alternative to increasing the replanting and new planting cess.

Governor Dewey in Malaya

During his visit to Malaya, where he arrived at the end of July, Thomas E. Dewey, Governor of New York, met representatives of the Malayan tin and rubber industries to hear their grievances on America's buying policy. The rubber men, in a 10-minute talk, attempted to present their side of the matter; they submitted facts and figures on rubber exports to show that Malayan producers and exporters were not holding up stocks to get a better price, and Dewey was said to have been sympathetic. The *Straits Times* of August 1, commenting editorially on the meetings, took a fling at Senators and the Reconstruction Finance Corp.:



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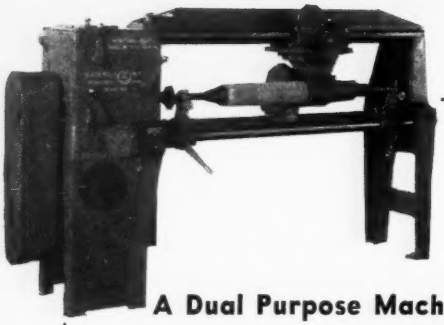

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"The Johnsons and the Larsons of the Senate Preparedness Committee are dangerous men," it said, accusing them of ignoring facts given them, for political reasons, and added: "If Mr. Dewey can make out a case for Republican consumption that Democratic policy is as wrong in South East Asia as he knows it to be wrong in America, then perhaps the Malayan case will be given an airing."

A few days later, the same paper reported that 40% of Malaya's latex-supplying rubber estates have stopped liquid latex production as a direct result of the United States Government's buying policy. Smallholders were said to be hardest hit, but it was expected that big estates would also experience difficulties.

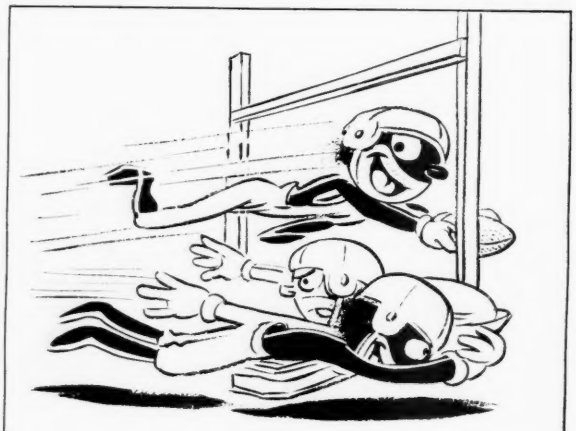
Higher Wages for Estate Workers

Wage increases for rubber workers have been awarded by the Rubber Arbitration Board on Plantation workers' claims in May. The workers had asked that the unit task of 450 trees or equivalent be reduced to 350 trees, and that the rate for a unit be raised to $4 a day, irrespective of the price of rubber. The Board recommended a sliding scale of wages based on the price of rubber involving three price ranges: $2 per pound and over, $1.50 and under $2.00 and $1.00 and under $1.50. Tasks will include from 250 to 600 trees, with wages depending on the size of the tasks and varying from $2.60 to $4.50 (on the basis of prices prevailing at the time of the decision). The Board further recommended that the average Singapore price over three months should govern wages for the following three months. If the price rises above $2.50 or falls below $1, fresh negotiations are to be held. It has been calculated that on the basis of May prices, tappers would receive on the average 65 cents a day more, and that costs of production would be raised by from 3-6 cents per pound (all Straits currency).

Other Plantation News

A seven-man delegation of rubber producers from Indonesia arrived in Kuala Lumpur in July for a three-day conference with representatives of the Rubber Producers' Council of Malaya. At the conference, which started July 17 and was the first of its kind, the main topics discussed were "extra development" of natural rubber in the United States and the part Indonesia, which was not at the time participating in propaganda for natural rubber, will take in this development work.

In June the Malyan Rubber Research Institute's experimental estate near Kuala Lumpur was raided by bandits whose lawlessness continues strong, and 1,000 trees that had been carefully developed for nine years as breeding stocks were slashed. Several estates report similar destruction, which in some cases have seriously lowered outputs. Hundreds of laborers and villagers were rendered homeless when bandits set fire to their dwellings during July.



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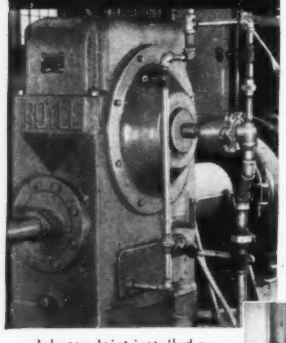

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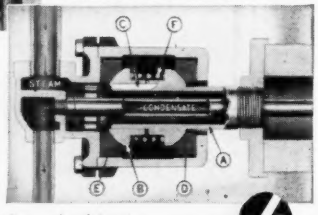
Johnson Joint installed on rubber extruder. Photo courtesy of Manhattan Rubber Div., Raybestos-Manhattan, Inc.



Rotating member consists of Nipple (A) and Collar (B), keyed together (C). Seal ring (D) and bearing ring (E) are of self-lubricating carbon graphite. Spring (F) is for initial seating only; joint is pressure sealed in operation.

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Editor's Book Table

BOOK REVIEWS

"Industrial Wastes, Their Conservation and Utilization." Charles H. Lipsett. Atlas Publishing Co., 425 W. 25th St., New York 1, N. Y. Cloth, 6 by 9 inches, 328 pages. Price, $5.

Written in semi-technical style, this book presents an overall picture of the production and utilization of waste materials by industry. Descriptions of the origins of the various types of wastes are included together with information on collection methods, marketing procedures, recovering processes, and their use by industry. Waste materials covered are rubber, plastics, metals, lubricants, fibers, leather, paper, textiles, paints, solvents, agricultural scrap, glass, and organic and chemical wastes.

The chapters on plastic scrap discuss the various types of plastics scrap and the processing of these wastes into useful materials, with information given on the machinery and equipment used for this purpose. The chapters on rubber scrap describe the different tire splitting and debeading operations and the various reclaiming methods. Tabulated data are presented on the growth of the scrap and the reclaim industries, with production figures and price comparisons.

"Rubber Red Book." 1951-52 Edition, Eighth Issue. Published by *Rubber Age*, 250 W. 57th St., New York 19, N. Y. Cloth 6 by 9 inches, 1,016 pages. Price, $7.50.

This edition of the "Red Book" continues the growth of the series, showing a total increase in number of pages, including advertisements, of 86 over the seventh issue. This increase in pages is reflected by corresponding increases in the various sections of the book. The general organization and classification system remains the same, but there are several changes: the listing of classified rubber products has been improved by a code numbering system; laboratory and testing equipment has been separated from regular machinery and equipment; a listing of the ORR copolymer plants has been included in the section on synthetic rubbers; and the scrap rubber section now contains a classified list of scrap rubbers.

The directory includes sections on rubber manufacturers in the United States and Canada; rubber machinery and equipment; accessories and fittings; rubber chemicals and compounding materials; fabrics and textiles; natural rubber and related material:; synthetic rubbers and rubber-like materials; reclaimed rubber; scrap ruber; latex; miscellaneous products and services; consulting technologists; branch offices and sales agents; trade and technical organizations; educational courses in rubber chemistry and technology; technical journals; who's who in the rubber industry; and both subject and advertisers' indices.

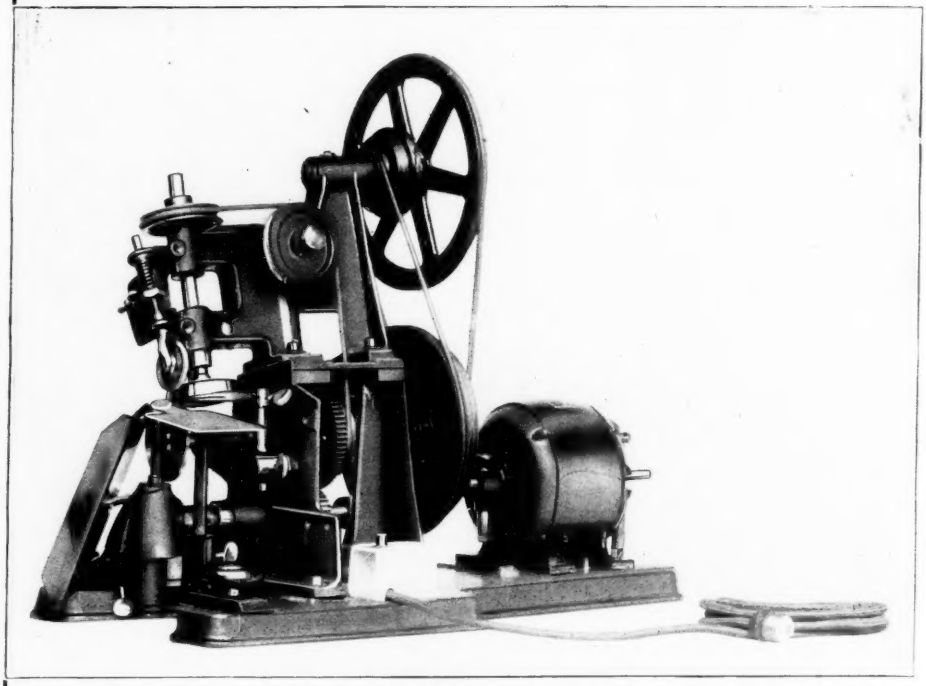
NEW PUBLICATIONS

Publications of Goodyear Tire & Rubber Co., Inc., Akron 16, O. **"Chemigum Latex 235."** Techni-Guide CL-235-1. 3 pages. **"Chemigum Latex 245."** Techni-Guide CL-245-1. 3 pages. These bulletins give detailed data on the properties, compounding, and applications of five Chemigum latices in the 235 series (butadiene/styrene ratio of 55/45) and three latices in the 245 series (butadiene/styrene ratio of 67/33). The eight latices, of which four are new products, provide a wide range of "tailored" materials for use in coating, impregnating, and compounding applications requiring unusual adhesion and resistance to oils and solvents.

"Rubber Developments." Vol. 4, No. 2, June, 1951. British Rubber Development Board, Market Bldgs., Mark Lane, London E.C.3, England. 32 pages. This issue contains stories on resin-rubber sole and heels for footwear, rubber in movie making, and rubber in road construction, as well as news notes or proposed applications for rubber.

"Anything Can Be Covered with Rubber." Automotive Rubber Co., Inc., Detroit 4, Mich. 12 pages. This illustrated catalog describes the company's design, engineering, and production facilities for the manufacture of all types of rubber covered parts and equipment.

T. W. MORRIS TRIMMING MACHINES



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Publications of the British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts., England.

"The Reaction of Olefins with Sulfur and with Hydrogen Sulfide." G. F. Bloomfield and R. F. Naylor. Publication No. 142. 10 pages. Work on the reaction products of olefins with sulfur and hydrogen sulfide is described in detail, and important conclusions are drawn as to the type of cyclic sulfide formed in vulcanization and the nature of the reactive mechanisms involved.

'Dielectric Relaxation of Natural Rubber Vulcanizates." A. Schallamach. Publication No. 143. 8 pages. The dielectric loss tangents of different types of pure-gum natural rubber vulcanizates are measured as functions of the frequency. For a given amount of combined sulfur, the loss tangent is found to decrease with increasing modulus of the rubber.

"Volume Changes in the Stretching of Vulcanized Natural Rubber." Goeffrey Gee, Jan Stern, and L. R. G. Treloar. Publication No. 144. 6 pages. Volume changes for small elongations of vulcanized natural rubber free of undissolved particles are measured and are found to agree with those calculated from known compressibility of the rubber and the hydrostatic component of the stretching force.

"Conjugation in Sulfones." H. P. Koch and W. E. Moffitt. Publication No. 145. 10 pages. The possibilities of conjugation in unsaturated or aromatic sulfones is investigated on the basis of molecular orbital theory. The type and the degree of conjugation are found to depend on the number and steric arrangement of the unsaturated groups attached to the sulfur atom.

"Determination of Absolute Rate Constants for Olefinic Oxidations by Measurement of Photochemical Pre- and After-Effects. I. At 'High' Oxygen Pressures." L. Bateman and G. Gee. "II. At 'Low' Oxygen Pressures." L. Bateman, J. L. Bolland, and G. Gee. Publication No. 146. 22 pages. The rate constants of the propagation and termination steps of the chain reaction responsible for the autoxidation of some non-conjugated olefins are determined from measurements under non-stationary state conditions.

"Anhydrides." Carbide & Carbon Chemicals Co., Division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. 16 pages. Complete physical property and shipping data are given on acetic, propionic, butyric, "Carbic," and tetrahydrophthalic anhydrides, together with specifications, test methods, and a bibliography of literature references.

"An Investigation on the Technical Classification of Indonesian Rubbers." A. G. J. Arentzen and W. den Breejen, Indonesian Institute for Rubber Research, Bogor, Java.

"I. Methods of Testing." No. 8/51. 6 pages. Methods for testing rubber are described which are used at present on Indonesian plantations for the purpose of technically classifying crude natural rubber. They are based on methods initiated by French rubber technologists,[1] but in some cases changes in these methods have been made in order to make use of apparatus available at the plantations and also to bring the procedures more in line with those used in American industry where most of the rubber is processed. Homogenizing of the rubber samples is done on a cold laboratory mill, and they are kept at normal tropical conditions. In testing for Mooney viscosity, a reduced time of shearing, two minutes at first and three minutes in the more recent tests, was used because of a lack of instruments to handle the large number of samples. For tension testing, the A. C. S-I formula was used, but the ingredients were added as a powder blend. The mixing cycle was 12 minutes, and the compounded stock was stored 20 to 24 hours in the dark at temperatures 22 to 32° C. at a relative humidity of about 65%. Two cures was made, 40 and 80 minutes at 127° C., of sheets five millimeters thick, from which rings were punched. Storage conditions of the vulcanizates were similar to those of the compounded stock. Testing was on a Schopper tensimeter with automatic recording, and the force was read at 665% elongation of the inner circumference (equivalent to 600% on dumbbell specimens), and the results are reported as 600% modulus.

"II. Results of a Survey of Export, November 1949." No. 9/51. 7 pages. Tables and graphs. Many tables of data and graphs illustrate the results of tests on various grades of rubber produced on the plantations of Indonesia. About 21% of the rubber exported in November, 1949, considered a normal month, was examined. Less than 4% of this rubber has a fast rate of cure, and nearly half is slow curing. About 15% has a low Mooney viscosity, and 40% a high viscosity. There is far less curing rubber produced in Indonesia than elsewhere.

[1] *Rev. gén caoutchouc*, 26, 597 (1949).

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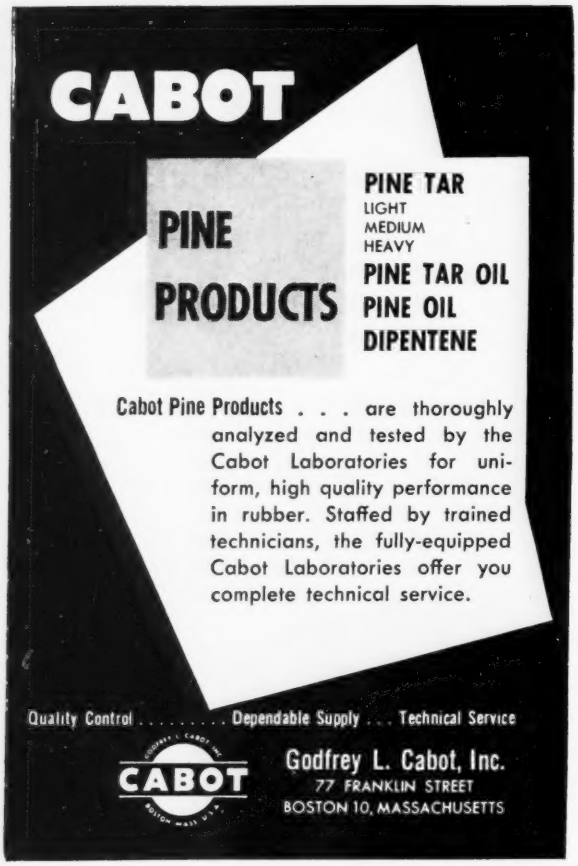
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"Barrett Plasticizers—Plastisol Formulations." Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 4 pages. Properties of three Elastex plasticizers are given together with data on their use in vinyl plastisols. Change of viscosity upon storage and properties of the film appear for six plastisol formulations.

"Annual Report on the Progress of Rubber Technology. Volume XIV, 1950." Edited by T. J. Drakeley. Published by W. Heffer & Sons, Ltd., Cambridge, England, for the Institution of the Rubber Industry 12 Whitehall, London S.W.1, England. Cloth, 7½ by 9¾ inches, 120 pages. Price, 1/1/10. Following the format of previous editions, this book is comprised of articles on developments during 1950 both generally and in the fields of planting and production of natural rubber; properties applications, and utilization of latex; physics and chemistry of rubber and its derivatives; synthetic rubber; testing equipment; fibers and fabrics; properties of vulcanized rubber; tires; belting; hose and tubing; cables and electrical insulation; mechanical goods; toys and sporting goods; surgical goods; proofed goods; solvents and cements; cellular rubber; hard rubber; flooring; processing and materials; and machinery and appliances. Name and subject indices are included.

"Elastomers and Plastomers." Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y. 8 pages. This bulletin describes the company's services in the field of rubber and plastics, including product development, product evaluation, trouble shooting, evaluation of new materials, and analysis.

"ASTM Standards on Rubber Products (With Related Information)." American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. May, 1951. 654 pages. Price, $5. This latest edition of Committee D-11's standards for rubber products presents in compact form the 100 test methods and specifications developed by the Committee. Many of these standards have been revised recently, and the book also includes two emergency alternate provisions for friction tape (D 69-48T) and rubber insulating tape (D 119-48T).

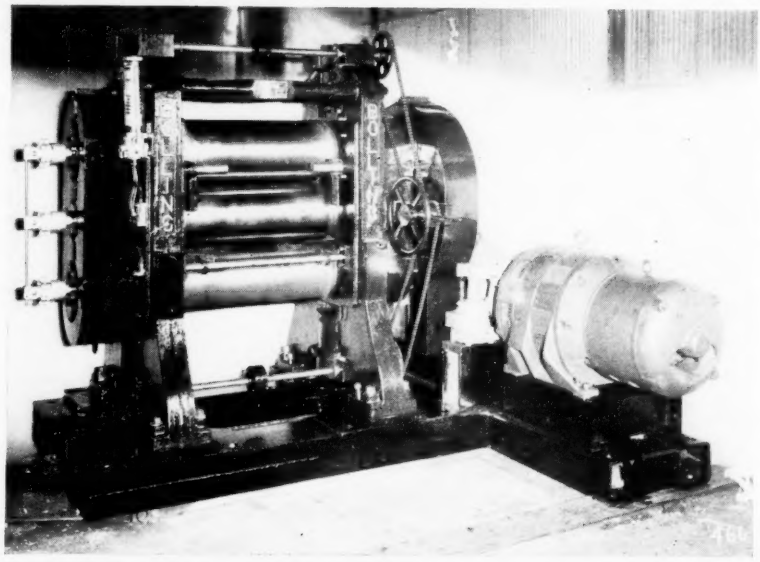
"Petrocarbon Air Separation Plants for Oxygen, Nitrogen, and the Rare Gases." Petrocarbon, Ltd., 170 Picadilly, London W.1, England. 12 pages. This illustrated bulletin describes the company's engineering and construction services for the building of small, medium, and large sized plants for the separation of gases.

"1951 Roster, Washington Rubber Group." Washington Rubber Group, R. E. Harmon, secretary, % Connecticut Hard Rubber Co., 1507 M St., N.W., Washington 5, D. C. 20 pages. This issue of the Group's roster marks the first step toward the publication of a yearbook in that it includes a history of the Group, a review of 1950-1951 activities, and a list of previous meeting speakers, in addition to lists of the members by names and company affiliations.

"Syton for Industrial Applications." Technical Bulletin No. M-100, Monsanto Chemical Co., Boston 49, Mass. 5 pages. Data are given on the properties and suggested applications of Syton C-30, a colloidal solution of hydrated silica in water for use in emulsion-type waxes, water-base finishes, textiles, latex, and other products.

Publications of American Agile Corp., Cleveland 3, O. **"Physical and Chemical Properties of Agilene (Polyethylene)."** 8 pages. Detailed data appear on the mechanical, thermal, and electrical properties of Agilene, together with a table showing the resistance of the material at both room and elevated temperatures to over 100 common chemicals. **"Agilene (Polyethylene) Fabricated Containers."** 7 pages. This bulletin describes and illustrates the various types and sizes of Agilene fabricated bottles, jars, and jugs for the storage and transportation of corrosive chemicals.

"The SR-4 in Industry." Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. 4 pages. Four ways in which SR-4 weighing units are being used in industry are briefly described and illustrated. Applications include crane hooks, multi-tank weighing and batch control of liquids, continuous weight integrators for belt-conveyed materials, and axle scales for loaded highway trucks.



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Publications of Phillips Chemical Co., Akron 8, O. "**Philback O in Natural Rubber Treads with Variable Sulfur-Accelerator Ratios.**" Philblack Bulletin No. 20. 7 pages. Detailed test data are presented on the properties obtained with 16 Philback O compounds at four sulfur levels with variable accelerator contents, and five EPC black compounds at five sulfur levels with variable accelerator contents. "**Rubber Grade Carbon Blacks.**" 1 page. This chart lists the different grades of carbon blacks available commercially, showing trade name, process, basic feed stock, type, distributer, and producer.

"**What the Air Pollution and Smoke Prevention Association of America Is Doing for Cleaner Air.**" Air Pollution & Smoke Prevention Association of America, 4400 Fifth Ave., Pittsburgh 13, Pa. 12 pages. "**Tenth Semi-Annual Report of the Atomic Energy Commission.**" July, 1951. United States Government Printing Office, Washington, D. C. 156 pages. "**Bi-Monthly Supplement to All Lists.**" June, 1951. Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago 11, Ill. 72 pages.

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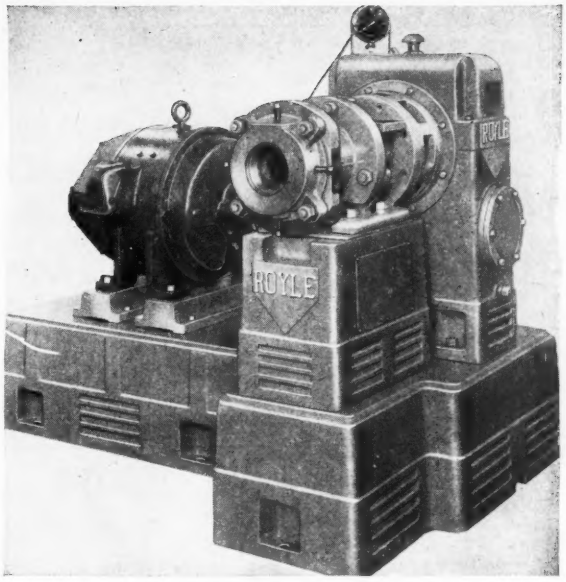

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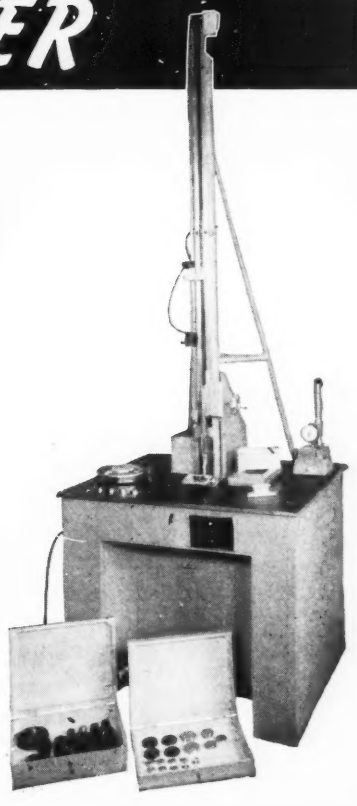

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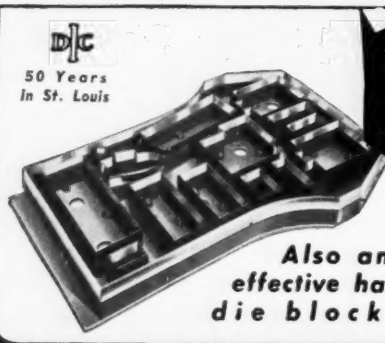

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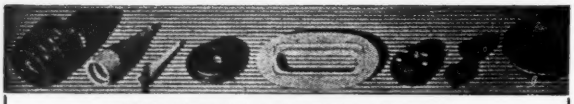
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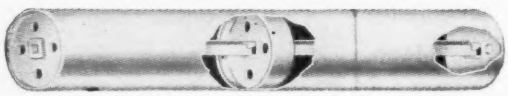
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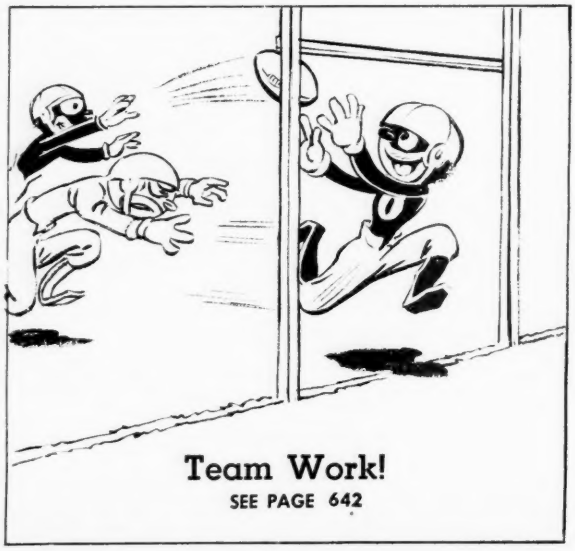
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MARKET REVIEWS

CRUDE RUBBER

RUBBER prices in the foreign market were firmer during the period from July 16 to August 15. As a result, United States Government buying for the stockpile was at a low level, and the government is expected to wait out more reasonable price levels before entering the market with any sizable demands.

Domestic purchasing of rubber from the government by factories was continuing at a slow but steady rate. Most manufacturers bought rubber on a hand-to-mouth basis and are said to be carrying slim inventories. With the GSA rubber selling price guaranteed through September and the possibility of a further price reduction after that time, manufacturers are prone to let the government carry their inventories for them.

Manufacturers have been watching Washington closely for any indications that the GSA might further reduce its selling price for natural rubber after September. Rubber prices at the primary markets have steadied since the last GSA price cut, however, and trade sources have received no indications that a further price reduction in price is anticipated at the present time.

Latices

THE latex stockpile has been achieved in just about the time predicted, and stocks of *Hevea* latex are now overflowing available storage space, according to Arthur Nolan, Latex & Rubber, Inc., writing in the August issue of *Natural Rubber News*. Latex bulk storage tanks at coastal ports of entry are full, and the overflow is being temporarily accommodated by dead storage in rail tank cars. While the oversupply is admittedly of a temporary nature until imports match or drop below usage, the condition has posed some distressing problems.

NPA control order M-2 does not now limit the use of *Hevea* latex as most requests to use latex have been granted. To all intents and purposes M-2 control over latex is non-existent and will probably soon be dropped from the order. With the stockpile achieved and an oversupplied market in effect, the industry believes that the time for government control has passed.

The GSA selling price for rail tank cars of bulk concentrated *Hevea* latex will remain at 64¢ a pound of total dry solids through September, and there have been no definite indications that a price reduction may be made on October 1. World market prices for this latex are below 64¢ a pound, and all forecasts for the future seem to be bearish. A reduction in price of *Hevea* latex would do much to stimulate the foam market and make possible a domestic consumption of 5,000-6,000 tons a month.

Final May figures on *Hevea* latex show imports of 4,534 long tons, dry weight; consumption, 3,474 long tons; and month-end stocks (exclusive of stockpile), 5,968 long tons. Estimated consumption for June is 3,200 long tons, and month-end stocks, 5,300 long tons.

GR-S latex is now in somewhat easier supply in view of decreased demand resulting from slower business. Cold latex is in strong demand with supply inadequate, but greater quantities are expected during the fourth quarter. GR-S latex production during July is estimated at 2,500 long tons, dry weight.

RECLAIMED RUBBER

THE first break in the continuing high demand for reclaimed rubber during the past few months came late in July. The reduction in demand was reported to be in the nature of 10% and is thought to be the result of the government-ordered slash in automobile production and the usual summer vacation let-down at consuming plants.

After rumors of impending issuance during the past two months, the OPS issued, on July 30, CPR 58 on Reclaimed Rubber, effective August 6. This regulation provides ceiling prices that in some cases afford some increases and in others, such as on tube reclaims, includes some rollbacks. While the legality of this regulation and other OPS ceiling price regulations is still in doubt as the result of recent Congressional action on the control program, the reclaim industry is going along with the order until the entire question is clarified.

Ceiling prices on reclaimed rubbers in carload quantities are given in CPR 58 as follows:

	Ceiling Prices, ¢/Lb. for Reclaimers	
	In California	In All Other Areas
Premium grade of specially selected whole tire reclaim (sp. gr. under 1.20)	9.75	10.5
First-line whole tire reclaim (sp. gr. under 1.20)	9.25	10
Second-line whole tire reclaim	8.75	9.5
Third-line whole tire reclaim	8.5	9.25
Fourth-line whole tire reclaim	8	8.75
Black carcass-type reclaim	13.25	14.25
No. 1 grade light-colored carcass reclaim (sp. gr. 1.25 and under)	17.75	20.75
No. 1 selected peel reclaim	11	11.75
Peel reclaim	9.75	10.5
Butyl tube reclaim	13.5	14.5
Special-purpose natural rubber black tube reclaim	19.75	21
Natural rubber black tube reclaim	18.75	20
Red tube reclaim	23.25	24.25
Gray tube reclaim	23.25	24.25

The regulation also provides for calculating the ceiling price for other grades of light-colored carcass reclaims.

Final May and preliminary June statistics on the domestic reclaimed rubber industry are now available. Final May figures give a production of 35,051 long tons; imports, 27 long tons; consumption, 34,148 long tons; exports, 1,512 long tons; and month-end stocks, 39,098 long tons. Preliminary figures for June show a production of 33,256 long tons; consumption, 31,358 long tons; exports, 1,455 long tons; and month-end stocks, 39,742 long tons.

SCRAP RUBBER

THE market for scrap rubber continued slow during the period from July 16 to August 15, and there are no signs of any improvement in the immediate future. In view of the reduced demand from reclaimers, prices for scrap rubber had already gone down to levels below the ceiling prices established by OPS in CPR 59, issued on July 30 and effective August 6.

Although meaningless in view of current scrap prices, the new ceilings represent a rollback from those existing under the general ceiling price regulation. Ceiling prices for scrap tires under CPR 59 are divided into the following two groups: (1) mixed tires, mixed passenger tires, and mixed truck and bus tires; and (2) mixed beadless tires, mixed beadless passenger tires, and mixed beadless truck and bus tires. Prices are as follows:

	(Per Net Ton) Group 1	Group 2
Akron, O., and Buffalo, N. Y.	$26.00	$34.00
Naugatuck, Conn., and Butler, N. J.	24.25	32.00
East St. Louis, Ill.	23.75	31.00
Memphis, Tenn.	23.00	30.25
Gadsden, Ala.	21.50	28.25
Los Angeles, Calif.	14.75	20.00

CPR 59 ceiling prices for delivered tire parts and scrap tubes are given in the following table:

	At Los Angeles (Per Net Ton)	All Other Consuming Centers (Per Net Ton)
Tire Parts		
Carcass, light colored	$130.00	$97.50
Black	50.00	33.50
Peelings, No. 1	65.00	52.75
2	42.00	31.00
3	38.00	27.00
Buffings	30.00	23.00
S. A. G., truck and bus	28.00	17.50
Passenger	28.00	17.50
Mixed	26.00	17.25
Tubes	(¢ Per Lb.)	
Light colored	16.0	15.0
Natural rubber, red	16.0	15.0
Black	11.5	10.5
Mixed	10.0	9.0
Butyl	5.7	5.0
GR-S	2.0	1.0
Mixed synthetic	3.0	2.0

Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points (Per Net Ton)	Akron, O. (Per Net Ton)
Mixed auto tires	$21.00	$21.00
Peelings, No. 1	60.00	60.30
3	29.50/31.00	29.50/31.00
	(¢ per Lb.)	
Black inner tubes	9.5/ 10	9.5/ 10
Red passenger tubes	13.5/ 14	13.5/ 14

RAYON

JULY shipments of rayon by United States producers to domestic consumers totaled 106,900,000 pounds, 2.5% below the level of the preceding month. Of this total, 28,000,000 pounds were of viscose high-tenacity yarn, showing no change from the

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June figure. Producers' stocks of high-tenacity yarn on July 31 amounted to 1,900,000 pounds, representing an increase of 100,000 pounds during the month.

Domestic rayon production during the second quarter of this year again broke all records, with a total of 336,900,000 pounds, a figure 3% greater than that of the first quarter and 2% above the previous record set in the last quarter of 1950. Second-quarter viscose high-tenacity yarn production amounted to 81,200,000 pounds, a figure slightly above the first-quarter level, but still 1% below the record set in the last quarter of 1950.

Total shipments of rayon filament yarn during the second quarter of 1951 were 249,900,000 pounds, 3% above the preceding-quarter figure but 1% below the record set during October-December, 9150. Yarn shipments to consumers for use in tires and related products totaled 76,300,000 pounds during the second quarter, an increase of only 100,000 pounds over the first-quarter figure. This small increase resulted from a shortage of high-tenacity yarn of suitable quality, inasmuch as producers' inventories of such yarn showed no changes over the quarter.

No changes were made in rayon tire yarn and fabric prices during the period from July 16 to August 15, and current prices follow:

Rayon Prices

Tire Yarns

1100/ 480	$0.62/	0.63
1100/ 490		.62
1150/ 490		.62
1650/ 720	.61/	.62
1650/ 980		.61
1900/ 980		.61
2200/ 960		.61
2200/ 980		.60
4400/2934		.63

Tire Fabrics

1100/490/2		.72
1650/980/2	.695/	.73
2200/980/2		.685

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	May 26	June 30	July 21	July 28	Aug. 4	Aug. 11
Oct.	38.02	36.06	34.82	34.95	34.27	34.73
Dec.	37.67	35.76	34.77	34.92	34.29	34.61
Mar.	37.59	38.80	34.76	34.92	34.32	34.68
May	37.46	35.72	34.67	34.89	34.30	34.67
July	36.97	35.37	34.35	34.57	34.00	34.32
Oct.	34.92	33.80	32.77	32.85	32.62	32.95

CONTINUING the trend of the previous month, cotton prices moved downward on the New York Cotton Exchange during the period from July 16 to August 15. Spot cotton prices fell steadily as a result of stronger indications of a bumper new crop and the continued dullness of the fabric market. New crop futures showed smaller declines than the spot prices because of short covering and hedging on the part of traders.

The latest estimate on the new cotton crop was 17,315,000 bales. This total is the largest since 1937 and can be compared with last year's poor crop of 10,012,000 bales. The two factors accounting for the great increase in the 1951 crop prospects are a 58% increase in cotton acreage and higher cotton yield per acre as the result of favorable weather and smaller boll weevil infestation.

The spot price for 15/16-inch middling cotton began the period at 41.74¢, dropped to 36.75¢ on July 31, was quoted at 36.31¢ on August 1, and closed at a low of 35.65¢ on August 15. October futures started at 34.92¢ on July 16, reached a high of 34.95¢ on July 27, a low of 34.27¢ on August 3, and ended the period at 34.39¢.

Fabrics

The current lack of demand for industrial cotton fabrics is reported to be the result of unusually heavy inventories in the hands of consumers, particularly the coating and automotive industries. While it is believed that these users will need goods for fourth-quarter and later delivery, they are holding off on forward purchases pending clarification of the confusion surrounding the government price regulations and the final estimates on the new cotton crop.

While only a few prices declined during the period, observers believe that further price adjustments on wide industrial fabrics can be expected for the fourth quarter in order to bring these goods down to levels more in line with other gray goods and cotton futures costs.

Cotton Fabrics

Drills			
59-inch 1.85-yd.	*yd.*	$0.44 /	$0.475
2.25-yd.		.37 /	.39
Ducks			
38-inch 1.78-yd. S. F.	*yd.*	.48⅞ /	.50⅝
2.00-yd. D. F.	*yd.*	.445 /	.46
51.5-inch, 1.35-yd. S. F.		.645 /	.66⅝
Hose and belting		.80	
Osnaburgs			
40-inch 2.11 yd.	*yd.*	.31 /	
3.65-yd.	*yd.*	.185	
Raincoat Fabrics			
Print cloth, 38½-inch, 64x60		.1425	
Sheeting, 48-inch, 4.17 yd		.26⅞ /	.27⅜
52-inch 3.85-yd.		.29⅛ /	.29⅜
Chafer Fabrics			
14-oz./sq. yd. Pl.	*lb.*	.83 /	.84
11.65-oz./sq. yd. S		.78 /	.80
10.80-oz./sq. yd. S.		.8175 /	.84
8.9-oz./sq. yd. S.		.83 /	.855
Other Fabrics			
Headlining, 58-inch 1.35-yd., 2-ply	*yd.*	.62	
64-inch, 1.25-yd. 2-ply		.725 /	.74
Sateens, 53-inch 1.32-yd.		.71	
58-inch 1.21-yd.		.775	
Tire Cords			
K. P. std., 12-3-3	*lb.*	nom.	
12-4-2		.91	

Discovers Sulful Deposit

Freeport Sulphur Co., New York, N. Y. has announced the discovery of a large new deposit of sulfur which is expected to be a major factor in easing the current world shortage of this essential material. According to a statement by Board Chairman John Hay Whitney and President L. M. Williams, Jr., the company will build a $10-15,000,000 mining plant having a production goal of 500,000 long tons of sulfur per year to develop the deposit, located at the mouth of the Mississippi River. The mine, said to be the largest single sulfur development in the world in nearly 20 years, is expected to be ready for operation in 1953. The deposit of native sulfur occurs in a typical salt dome formation and was discovered by the Texas Co. in exploring for oil. Freeport obtained the sulfur rights early this year and under its lease will pay Texas 50% of the profits derived from the operation.

Financial

(*Continued from page 728*)

Phelps Dodge Corp., New York, N. Y. First six months, 1951: net earnings, $21,156,559, equal to $4.17 a share, against $17,972,895, or $3.54 a share, in the like period last year.

Phillips Petroleum Co., Bartlesville, Okla., and subsidiaries. First half, 1951: net profit, $32,002,597, equal to $2.46 a share, compared with $22,039,857 or $1.82 a share, in the 1950 half.

Raybestos-Manhattan, Inc., Passaic, N. J. First half, 1951: net earnings, $2,558,442, equal to $4.07 a common share, against $1,545,592, or $2.46 a share, in the 1950 period.

Resistoflex Corp., Belleville, N. J. Year ended June 30: net profit, $139,920, or 42¢ a common share, against $35,161, or 14¢ a share, in the preceding fiscal year; net sales, $1,688,488, against $1,144,356.

Thermoid Co., Trenton, N. J. First six months, 1951: net earnings, $1,039,087, equal to $1.22 each on 800,603 shares, contrasted with $704,297, or 85¢ each on 750,000 shares, in the 1951 half; consolidated sales, $21,026,325, against $12,303,386.

Timken Roller Bearing Co., Canton, O. First half, 1951: net earnings, $8,184,059, equal to $3.37 a share, against $8,201,944, or $3.39 a share, in the 1950 half.

United Carbon Co., New York, N. Y. Half ended June 30: net profit, $1,829,724, equal to $2.30 a share, against $1,639,766, or $2.06 a share, in the 1950 half.

S. S. White Dental Mfg. Co., Philadelphia, Pa. Six months to June 30: net earnings, $680,522, equal to $1.94 a share, compared with $284,479, or 81¢ a share, a year earlier.

Cooper Tire & Rubber Co., Findlay, O. First half, 1951: net profit, $142,806, equal to 91¢ each on 156,921 common shares, against $122,472, or 78¢ a share, in the 1950 period; net sales, $9,941,958, against $5,139,909.

Moves Textile Offices

United States Rubber Co.'s textile division moved its consumer fabrics department September 4 to 1407 Broadway, New York, N. Y., and closed its headquarters at 40 Worth St. Under James G. Fitzgerald, sales manager of the department, the office will handle the sale of the U. S. Royal line of fabrics, including Rubiyarn and Yarmouth ginghams, Pon O'Woods demins, and U. S. Royalon rayons.

The Institution of the Rubber Industry

LONDON

THE RUBBER INDUSTRY owes its development largely to scientific and technical research and the Institution was founded in 1921 to foster scientific and technical advancement and to disseminate the results.

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To promote the profession and practice of Rubber Technology.

To encourage the extension of scientific and technical education in the principles and details of rubber manufacture.

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Proceedings of Rubber Technology Conferences.

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At this time of progress and expansion in the affairs of the Institution, its Council, conscious of the benefits that lie within the sphere of the Institution, invites applications for the privilege of membership from those engaged or interested in the Rubber and its allied industries.

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Abrasives

Pumicestone, powdered	lb.	$0.025	/ $0.055
Rottenstone, domestic	ton	40.00	/ 48.00

Accelerators, Organic

A-10	lb.	.40	/ .47
A-19	lb.	.52	/ .58
A-32	lb.	.59	/ .69
A-77	lb.	.47	/ .60
A-100	lb.	.47	/ .60
Accelerator 8	lb.	.98	
49	lb.	.48	/ .49
552	lb.	2.00	
808	lb.	.59	/ .61
833	lb.	1.13	/ 1.15
Altax	lb.	.38	/ .40
Rodform	lb.	.385	/ .405
Arazate	lb.	2.16	
Beutene	lb.	.59	/ .64
B-J-F	lb.	.27	/ .32
Butasan	lb.	1.00	
Butazate	lb.	1.00	
Butyl Eight	lb.	1.00	/ 1.05
Zimate	lb.	1.00	
Captax	lb.	.30	/ .32
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Cuprax	lb.	.60	/ .62
Diesterex N	lb.	.50	/ .57
DOTG (diorthotolyguanidine)	lb.	.52	/ .53
DPG (diphenylguanidine)	lb.	.42	/ .45
El-Sixty	lb.	.61	/ .68
Ethasan	lb.	1.00	
Ethazate	lb.	1.00	
Ethex	lb.	1.00	
Ethyl Thiurad	lb.	1.00	
Tuads	lb.	1.00	
Tuex	lb.	1.00	
Zimate	lb.	1.00	
Ethylac	lb.	.88	/ .90
Good-rite Erie	lb.	.32	/ .34
Hepteen	lb.	.42	/ .48
Base	lb.	1.80	/ 1.90
Ledate	lb.	1.00	
M-B-T	lb.	.34	/ .39
-XXX	lb.	.46	/ .48
M-B-T-S	lb.	.42	/ .47
Pellets	lb.	.425	/ .445
Mertax	lb.	.50	/ .57
Methesan	lb.	1.00	
Methazate	lb.	1.00	
Methyl Selenac	lb.	1.60	
Tuads	lb.	1.10	
Zimate	lb.	1.00	
Monex	lb.	1.10	
Mono-Thiurad	lb.	1.10	
Morfex	lb.	.59	/ .64
O-X-A-F	lb.	.43	/ .48
Pentex	lb.	1.00	
Flour	lb.	.20	
Phenex	lb.	.40	/ .45
Pipazate	lb.	1.53	
Rodform products	lb.	1.00	/ 3.00
Rotax	lb.	.42	/ .44
S. A. 52	lb.	1.10	
57, 62, 67, 77	lb.	1.00	
66	lb.	1.45	
Safex	lb.	1.15	
Santocure	lb.	.68	/ .75
Selazate	lb.	1.45	
Selenac	lb.	1.45	
SPDX-GH	lb.	.64	/ .69
Tellurac	lb.	1.45	
Tepidone	lb.	.55	
Tetrone A	lb.	1.85	
Thiofide	lb.	.42	/ .49
S	lb.	.465	/ .535
Thionex	lb.	1.10	
Thiotax	lb.	.34	/ .41
Thiurad	lb.	1.10	
Thiuram E	lb.	1.00	
M	lb.	1.10	
Trimene	lb.	.54	/ .64
Base	lb.	1.03	/ 1.18
Tuex	lb.	1.10	
2-MT	lb.	.75	
Ultex	lb.	1.00	/ 1.10
Ureka Base	lb.	.66	/ .73
Z-B-X	lb.	2.45	
Zenite	lb.	.42	/ .44
A	lb.	.50	/ .52
Special	lb.	.43	/ .45
Zetax	lb.	.38	/ .41

Accelerator-Activators, Inorganic

Lime hydrated	ton	9.00	/ 15.00
Litharge, comml.	lb.	.1875	/ .206
Eagle, sublimed	lb.	.1975	/ .1985
National Lead	lb.	.205	/ .206
Red Lead, comml.	lb.	.1975	/ .22
Eagle	lb.	.2075	
National Lead	lb.	.215	
White lead, basic	lb.	.185	/ .195
Eagle, National Lead	lb.	.185	/ .195
White lead, silicate	lb.	.1625	/ .2225
Eagle	lb.	.2025	/ .2225
National Lead	lb.	.1625	/ .1725
Zinc oxide, comml.†	lb.	.16	/ .1925

Accelerator-Activators, Organic

Aktone A, B	lb.	$0.22	/ $0.23
Barak	lb.	.60	
Curade	lb.	.57	/ .59
D-B-A	lb.	1.95	
Delac P	lb.	.45	/ .52
Emersol 110	lb.	.1425	/ .155
120	lb.	.1475	/ .16
130	lb.	.17	/ .1825
210 Elaine	lb.	.1475	/ .175
Emery 600	lb.	.13	/ .1375
Guantal	lb.	.55	/ .62
Hyfac 430	lb.	.1775	/ .19
431	lb.	.1875	/ .20
Laurex	lb.	.29	/ .32
Lead oleate	lb.	.24	
MODX	lb.	.295	/ .345
NA-22	lb.	1.50	
Palmalene	lb.	.35	
Plastone	lb.	.27	/ .30
Polyac	lb.	1.60	
Ridacto	lb.	.25	/ .26
Seedine	lb.	.1485	/ .1705
SOAC-KL	lb.	.08	/ .11
Stearex Beads	lb.	.14¾	/ .15⅞
Stearic acid, single pressed	lb.	.1525	/ .165
Double pressed	lb.	.1575	/ .17
Triple pressed	lb.	.18	/ .1925
Stearite	lb.	.095	/ .10
Tonox	lb.	.50	/ .59
Zinc stearate	lb.	.41	/ .43

Alkalies

Caustic soda, flake	100 lbs.	3.75	/ 6.77
Liquid, 50%	100 lbs.	2.55	/ 2.75
Solid	100 lbs.	3.35	/ 5.05

Antioxidants

AgeRite Gel	lb.	.60	/ .62
H.P.	lb.	.67	/ .69
Hipar	lb.	.91	/ .93
Powder	lb.	.49	/ .51
Resin	lb.	.65	/ .67
D	lb.	.49	/ .51
Stalite	lb.	.49	/ .51
White	lb.	1.40	/ 1.50
D	lb.	1.45	/ 1.55
Akroflex C, F	lb.	.67	/ .69
Albasan	lb.	.69	/ .73
Aminox	lb.	.49	/ .58
Antioxidant 2246	lb.	1.60	/ 1.63
Antisol	lb.	.23	/ .24
Antox	lb.	.49	/ .51
Aranox	lb.	3.25	
Betanox Special	lb.	.70	/ .79
B-L-E, -25	lb.	.49	/ .58
B-X-A	lb.	.43	/ .52
Copper Inhibiter X-872-L	lb.	1.95	
Flectol H	lb.	.49	/ .56
Flexamine	lb.	.67	/ .76
Heliozone	lb.	.25	/ .26
Ionol	lb.	.95	/ 1.40
NBC	lb.	1.50	
Neozone A	lb.	.51	/ .53
C	lb.	.67	
D	lb.	.45	/ .51
Perflectol	lb.	.61	/ .68
Permalux	lb.	1.85	
Rio Resin	lb.	.52	/ .54
Santoflex 35	lb.	.67	/ .74
AW	lb.	.75	/ .82
B	lb.	.49	/ .56
BX	lb.	.60	/ .67
Santovar A	lb.	1.50	/ 1.57
O	lb.	1.30	/ 1.37
Santowhite Crystals	lb.	1.55	/ 1.62
L	lb.	.49	/ .56
MK	lb.	1.25	/ 1.32
S.C.R.	lb.	.32	/ .34
Sharples Wax	lb.	.23	/ .28
Stabilite	lb.	.49	/ .51
Alba	lb.	.72	/ .77
L	lb.	.60	/ .62
White	lb.	.49	/ .56
Powder	lb.	.39	/ .43
Sunolite	lb.	.20	
Sunproof	lb.	.25	/ .30
Improved	lb.	.23	/ .28
Jr	lb.	.18	/ .23
Thermoflex A	lb.	.98	/ 1.00
Tonox	lb.	.50	/ .59
Tysonite	lb.	.215	/ .2225
V-G-B	lb.	.65	/ .74
Wing-Stay S	lb.	.48	/ .58
Zenite	lb.	.33	/ .35

Antiseptics

Copper naphthenate, 6-8%	lb.	.2575	
Pentachloropnenol	lb.	.20	/ .28
Resorcinol, technical	lb.	.84	/ .85
Zinc naphthenate, 8-10%	lb.	.24	/ .2925

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed; contact suppliers for spot prices.

†For trade names, see Color—White, Zinc Oxide.

Blowing Agents

Ammonium, bicarbonate	lb.	$0.055	/ $0.06
Carbonate	lb.	.23	/ .24
Sodium bicarbonate	100 lbs.	2.10	/ 3.15
Carbonate, technical	100 lbs.	1.20	/ 5.02
Unicel	lb.	.82	
ND	lb.	1.40	
S	lb.	.20	

Bonding Agents

BAC Latex	lb.	.75	/ .80
MDI-50	lb.	2.75	/ 3.25
Ty-Ply BN, Q, S	gal.	6.75	/ 8.00

Brake Lining Saturants

B.R.T. No. 3	lb.	.024	/ .025
Resinex L-S	lb.	.0225	/ .03

Carbon Blacks

Conductive Channel—CC

Continental R-20, -40	lb.	.15	/ .22
Kosmos/Dixie BB	lb.	.18	/ .215
Spheron C	lb.	.14	/ .185
N	lb.	.25	/ .30
Voltex	lb.	.18	/ .315

Easy Processing Channel—EPC

Continental AA	lb.	.069	/ .1175
Kosmobile 77/Dixiedensed 77	lb.	.069	/ .1175
Micronex W-6	lb.	.07	/ .1225
Spheron #9	lb.	.074	/ .1225
Texas E	lb.	.07	/ .1175
Witco #12	lb.	.069	/ .1175
Wyex	lb.	.074	/ .12

Hard Processing Channel—HPC

Continental F	lb.	.069	/ .1175
HX	lb.	.074	/ .12
Kosmobile S/Dixiedensed S	lb.	.069	/ .1175
Micronex Mk. II	lb.	.07	/ .1225
Spheron #4	lb.	.074	/ .1225
Witco #6	lb.	.069	/ .1175

Medium Processing Channel—MPC

Arrow TX	lb.	.074	/ .12
Continental A	lb.	.069	/ .1175
Kosmobile S-66/Dixiedensed S-66	lb.	.069	/ .1175
Micronex Standard	lb.	.07	/ .1225
Spheron #6	lb.	.074	/ .1225
Texas M	lb.	.07	/ .1175
Witco #1	lb.	.069	/ .1175

Conductive Furnace—CF

Statex A	lb.	.08	/ .10

Fast Extruding Furnace—FEF

Statex M	lb.	.0575	/ .10
Sterling SO	lb.	.06	/ .10

Fine Furnace—FF

Statex B	lb.	.0625	/ .105
Sterling 99	lb.	.065	/ .105

High Abrasion Furnace—HAF

Aromex	lb.	.079	/ .125
Philblack O	lb.	.075	/ .119
Statex R	lb.	.075	/ .125
Vulcan #3	lb.	.079	/ .122

Medium Abrasion Furnace—MAF

Philblack A	lb.	.0575	/ .10

High Modulus Furnace—HMF

Continex HMF	lb.	.05	/ .09
Kosmos 40/Dixie 40	lb.	.05	/ .09
50/Dixie 50	lb.	.055	/ .095
Modulex	lb.	.055	/ .095
Statex 93	lb.	.0525	/ .095
Sterling L	lb.	.055	/ .095

Reinforcing Furnace—RF

Kosmos 60/Dixie 60	lb.	.074	/ .1125

Semi-Reinforcing Furnace—SRF

Continex SRF	lb.	.035	/ .075
Essex	lb.	.04	/ .08
Furnex	lb.	.0375	/ .08
Gastex	lb.	.045	/ .085
Kosmos 20/Dixie 20	lb.	.035	/ .075
Pelletex	lb.	.04	/ .08
Sterling NS, S	lb.	.04	/ .08

Very Fine Furnace—VFF

Statex K	lb.	.075	/ .125

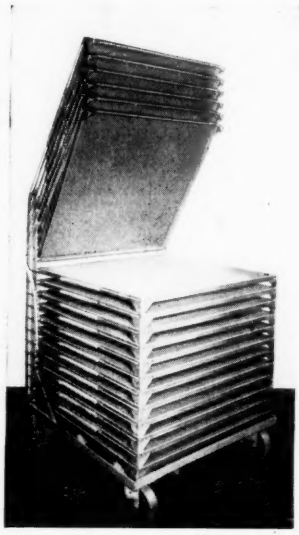
Fine Thermal—FT

P-33	lb.	.05	

Medium Thermal—MT

Thermax	lb.	.0325	
Stainless	lb.	.04	

SPRING LEAF TRUCK



This new Truck gives unobstructed access to three sides of each tray and offers a convenient method for storing materials that require cooling or air drying. The one piece construction Trays are spring supported and can be quickly raised or lowered, free from all locking devices. Trucks having 18 perforated trays 36″ x 36″ or plain surface trays 36″ deep by 4 ft., 6 ft. and 8 ft. long, can be furnished either stationary or mounted on casters.

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Sublimed White Lead
Litharge • Sublimed Litharge
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Chemical Stabilizers

Advastab #21	lb.	$1.06	/	$1.12
Dutch Boy CS-137	lb.	.125	/	.125
DS-207	lb.	.54	/	.56
Dyphos	lb.	.5875	/	.6075
Dythal	lb.	.415	/	.435
Normasal	lb.	.4675	/	.4875
Plumb-O-Sil A	lb.	.2925	/	.3125
B	lb.	.3075	/	.3275
C	lb.	.3325	/	.3525
Tribase	lb.	.265	/	.285
E	lb.	.2325	/	.2525
Stabilizer #3, #52	lb.	2.10	/	2.20
B-5	lb.	.70	/	.75
BC-12	lb.	1.03	/	1.10
E-6-B	lb.	.90	/	1.00
JCX	lb.	.67	/	.76
L Paste	lb.	.60	/	.65
SN	lb.	.47	/	.53
V-I-N	lb.	.42	/	.50
Dry Powder	lb.	.75	/	.80
V-9	lb.	.85	/	.90
VL-2	lb.	1.26	/	1.32
-3	lb.	1.17	/	1.23
Vanstay 16, 25	lb.	.33	/	.35
H	lb.	.75	/	.77
Witco Lead Stearate #50	lb.	.5025		
Stabilizer #70	lb.	1.25		

Colors

Black

Black Paste #25	lb.	.22	/	.40
BK Iron Oxides	lb.	.11	/	.1125
Covinylblaks	lb.	.62	/	1.14
Lampblack, comml.	lb.	.16	/	.45
Superjet	lb.	.075	/	.11
Mapico	lb.	.1175	/	.12
MB Mineral Blacks	lb.	.0315	/	.0675

Blue

Du Pont	lb.	1.77	/	4.55
Heveatex pastes	lb.	.80	/	1.45
Stan-tone	lb.	1.00	/	1.35
Toners	lb.	.30	/	3.50

Brown

Brown Paste #5, #10	lb.	.35	/	.45
Mapico	lb.	.1275	/	.13
Tan	lb.	.1975	/	.20
Metallic brown	lb.	.0315	/	.044
Plastics brown	lb.	.0625	/	.07
Sienna, burnt	lb.	.0425	/	.155
Raw	lb.	.045	/	.1325
Umber, burnt	lb.	.06	/	.065
Raw	lb.	.0625	/	.0675

Green

Chrome	lb.	.17	/	.4875
Oxide	lb.	.375	/	1.20
Du Pont	lb.	1.50	/	3.20
G-4099, -6099	lb.	.34	/	.345
G-7599	lb.	.405	/	.41
GH-9869	lb.	.85	/	1.00
9976	lb.	.95	/	1.10
Heveatex pastes	lb.	.95	/	1.85
Stan-Tone	lb.	1.50	/	3.30
Toners	lb.	.35	/	4.00

Orange

Du Pont	lb.	2.75		
Orange Paste #13	lb.	1.35	/	1.50
Stan-Tone	lb.	1.65	/	2.25
Toners	lb.	.30	/	1.50

Red

Antimony trisulfide	lb.	.42	/	.425
R. M. P. No. 3	lb.	.55	/	.60
R. M. P. Sulfur Free	lb.	.63	/	.68
Cadmium red lithopone	lb.	1.70	/	2.10
Du Pont	lb.	1.32	/	1.80
Indian Red	lb.	.125		
Iron oxide, red	lb.	.0525	/	.12
Light	lb.	.1175	/	.12
Mapico	lb.	.1225	/	.125
Red Paste #17, I-2	lb.	.95	/	1.10
Rub-Er-Red	lb.	.0975		
Stan-Tone	lb.	1.10	/	3.05
Toners	lb.	.25	/	4.15

White

Antimony oxide	lb.	.445	/	.46
Burgess Iceberg	ton	50.00		
Lithopone, titanated	lb.	.09½	/	.10⅜
Cryptone BT	lb.	.09⅜	/	.10⅞
Titanium pigments				
Rayox LW	lb.	.195	/	.205
R-110	lb.	.215	/	.225
Ti-Cal	lb.	.075	/	.0825
Ti-Pure	lb.	.195	/	.225
Titanox A-168, -LO, -MO	lb.	.195	/	.205
RA, RA-10	lb.	.215	/	.225
RCHT	lb.	.075	/	.08
Zopaque	lb.	.195	/	.205
Zinc oxide, comml.	lb.	.16	/	.1925
Azo ZZZ-11, -44, -55	lb.	.16	/	.17
66	lb.	.1825	/	.1925
35% leaded	lb.	.16⅝	/	.17⅛
Eagle AAA, lead free	lb.	.16	/	.17
5% leaded	lb.	.16	/	.17
35% leaded	lb.	.16⅝	/	.17⅛
50% leaded	lb.	.16⅞	/	.17⅜
Florence Green Seal	lb.	.1775	/	.1875
Red Seal	lb.	.1725	/	.1825
White Seal	lb.	.1825	/	.1925
Horsehead XX-4, -78	lb.	.16	/	.17
Kadox-15, -17, -22	lb.	.16	/	.17
-25	lb.	.1825	/	.1925
Lehigh, 35% leaded	lb.	$0.16⅝	/	$0.17⅝
50% leaded	lb.	.16⅞	/	.17⅞
Protox-166, -167	lb.	.16	/	.17
St. Joe, lead free	lb.	.16	/	.17
Standard, 5% leaded	lb.	.16	/	.17
Zinc sulfide, comml.	lb.	.24		
Cryptone ZS	lb.	.20	/	.21

Yellow

Cadmium yellow lithopone	lb.	1.32		
Chrome	lb.	.32		
Du Pont	lb.	1.62	/	2.15
Iron oxide, yellow	lb.	.0141	/	.0975
Mapico	lb.	.10	/	.1025
Stan-Tone	lb.	1.00	/	1.55
Toners	lb.	.50	/	1.37
Yellow D	lb.	1.25	/	1.35

Dispersing Agents

Darvan Nos. 1, 2	lb.	.21	/	.30
Stan-Chem	lb.	.1225	/	.2587
Triton R-100	lb.	.12	/	.25

Dusting Agents

D-Tac	lb.	.21	/	.23
Extrud-o-Lube conc.	gal.	1.84		
Glycerized Liquid, Lubricant, concentrated	gal.	1.48		
Lubrex	lb.	.25	/	.30
Mica	lb.	.07	/	.0775
Pyrax A	ton	12.50		
W. A.	ton	15.00		
Snow Crest Talc	ton	33.00	/	35.00
Vanfre	gal.	2.00	/	2.50

Extenders

Advagum 1098	lb.	.61	/	.69
B. R. S. 700	lb.	.0175	/	.026
B. R. T. No. 7	lb.	.0265	/	.0275
Dielex B	lb.	.06		
Factice, Amberex	lb.	.30	/	.38
Brown	lb.	.12	/	.33
Neophax	lb.	.18	/	1.35
Ozonite	lb.	.2365		
White	lb.	.13	/	.32
G. B. Asphaltenes	lb.	.06	/	.065
Mineral Rubbers				
Black Diamond	ton	38.00	/	40.00
Extender 600	lb.	.18		
Hard Hydrocarbon	ton	38.00	/	40.00
No. 38	ton	38.00	/	40.00
Parmr	ton	21.00	/	29.00
Nuba No. 1, 2	lb.	.04		
3X	lb.	.065		
Rubber substitute, brown	lb.	.18	/	.317
White	lb.	.16	/	.33
Sublac B-2, PX-5	lb.	.26	/	.28
Synthetic 100	lb.	.41		

Fillers, Inert

Barytes, floated, white	ton	37.60	/	61.75
Off-color, domestic	ton	19.00	/	20.00
No. 1	ton	37.60	/	52.40
2	ton	35.60	/	50.40
Blanc fixe	ton	90.00	/	130.00
Clays				
Albacar	ton	40.00	/	50.00
Aluminum Flake	ton	16.00	/	22.00
#5	ton	21.00		
Champion	ton	14.00		
Crown	ton	14.00	/	33.00
Hi-White R	ton	13.50	/	33.00
Hydratex R	ton	30.00		
Paragon	ton	13.50	/	31.50
McNamee	ton	13.50		
RX-43	ton	33.00		
Stan-Tex White	ton	25.00		
Stellar-R	ton	50.00		
Suprex	ton	14.00	/	33.00
W-1291 English	ton	53.00	/	55.00
Witco #1	ton	14.00	/	30.00
#2	ton	13.50	/	30.00
Cryptone BA, CB, MS	lb.	.08	/	.0825
Flocks				
Cotton, dark	lb.	.095	/	.112
Dyed	lb.	.45	/	.85
White	lb.	.12	/	.20
Fabrifil X-24-G	lb.	.095		
X-24-W	lb.	.135		
Filfloc 6000	lb.	.16		
F-40-900	lb.	.105		
Solka-Floc	lb.	.05	/	.15
Kalite	ton	50.00		
Lithopone, comml.	lb.	.075	/	.085
Albalith	lb.	.075	/	.085
Astrolith	lb.	.063⅝	/	.0675
Eagle	lb.	.0725	/	.075
Sunolith	lb.	.063⅝	/	.0675
Mica	lb.	.07	/	.0775
Millical	ton	32.50		
No. 1 Silica	ton	22.00	/	40.00
Non-Fer-Al	ton	25.00		
Purecal D	ton	50.00	/	65.00
M	ton	45.00	/	65.00
Pyrax A	ton	12.50		
W. A.	ton	15.00		
SL Slate Flour	ton	17.00	/	25.00
Suspenso	ton	30.00		
Terra Alba 1319	ton	27.00		
Ti-Cal	lb.	.0675		
Whiting, limestone	ton	6.00	/	15.00
Paxinosa	ton	9.00	/	17.00
Witco	ton	8.50		

Finishes

Black-Out	gal.	4.50	/	8.00
Flexible Rubber Paints	gal.	4.00	/	9.00
Flocks				
Cotton, dark	lb.	$0.095	/	$0.112
Dyed	lb.	.45	/	.85
White	lb.	.12	/	.20
Rayon, colored	lb.	.90	/	1.50
White	lb.	.75	/	1.25
Rubber lacquer, clear	gal.	1.00	/	2.00
Colored	gal.	2.00	/	3.50
Shoe varnish	gal.	1.45		
Talc	ton	14.00	/	35.00
Wax, Bees	lb.	.68	/	.81
Carnauba	lb.	1.05	/	1.20
Montan	lb.	.25	/	.32
No. 118, colors	gal.	.86	/	1.41
Neutral	gal.	.76	/	1.31
Van Wax	gal.	1.25	/	1.30

Latex Compounding Ingredients

Accelerator 552	lb.	1.80		
Aerosol	lb.	.35		
Agerite Dispersions	lb.	.60	/	2.25
Amberex Solutions	lb.	.1675	/	.18
Aquablaks	lb.	.0725	/	.1875
Aquarex D	lb.	.80		
L Paste	lb.	.94		
MDL Paste	lb.	.33		
ME	lb.	.97		
NS	lb.	.60		
SMO	lb.	.50		
WA Paste	lb.	.28		
Areskap 50	lb.	.30	/	.38
100, dry	lb.	.60	/	.72
Aresket 240	lb.	.30	/	.38
300, dry	lb.	.60	/	.72
Aresklene 375	lb.	.42	/	.57
Black No. 25, dispersed	lb.	.22		
Casein	lb.	.395	/	.45
CW-12	lb.	.85		
CW-37	lb.	.70		
DC Antifoam A	lb.	5.65	/	6.65
Dispersed Sulfur No. 2	lb.	.10	/	.12
Ethyl Thiurad	lb.	1.00		
Factice dispersions	lb.	.23	/	.44
Habuco Resin Emulsion				
#226	lb.	1.05		
#2246	lb.	1.30		
#2402, #2343	lb.	1.60		
Laton L	lb.	.075	/	.0775
Ludox	lb.	.1675	/	.1925
Marmix	lb.	.41	/	.48
Methocel	lb.	.62	/	.80
Micronex, colloidal	lb.	.06	/	.07
Pip-Pip	lb.	2.25		
Pliolite Latex 150, 190	lb.	.32	/	.41
170	lb.	.37	/	.46
Polyca 117-SS	lb.	.18	/	.265
296	lb.	.13	/	.185
350	lb.	.25	/	.37
R-2 Crystals	lb.	2.20		
Resin Emulsion A-155	lb.	.13	/	.18
P-370	lb.	.125	/	.175
Resin V	lb.	.13		
Santomerse D	lb.	.44	/	.65
S	lb.	.13	/	.25
Setsit No. 5	lb.	1.00		
SPDX-GL	lb.	.95		
Stablex A	lb.	.90	/	1.10
B	lb.	.50	/	.95
G	lb.	.50	/	.70
L	lb.	.30	/	.40
Sulfur Dispersion, 50%	lb.	.07	/	.15
66⅔%	lb.	.09	/	.17
73%	lb.	.10	/	.12
Tergitol wetting agents	lb.	.265	/	.37
Thiocarbanilide (A-1)	lb.	.48	/	.55
Zinc oxide, dispersed	lb.	.13	/	.20

Mold Lubricants

Aquarex D	lb.	.76		
L Paste	lb.	.85		
MDL Paste	lb.	.30		
WA Paste	lb.	.25		
Carbowax compounds	lb.	.29	/	.295
Colite Concentrate	gal.	.90	/	1.15
ELA	lb.	.80		
DC Mold Release Fluid Emulsion Nos. 35, 35A, 35B	lb.	4.14	/	6.00
DC 7	lb.	1.68	/	3.50
Glycerized Liquid Lubricant, concentrated	gal.	6.20	/	6.80
Lubrex	lb.	1.48		
Mold Paste	lb.	.25	/	.30
Monten Wax	lb.	.25		
Para Lube	lb.	.57		
Polyethylene Glycols	lb.	.046	/	.048
Sodium stearate	lb.	.23		
Stearite	lb.	.43	/	.44
Vanfre	gal.	.095	/	.10
		2.00	/	2.50

Odorants

Alamasks	lb.	.60	/	6.50
Curodex 19	lb.	4.75		
188	lb.	5.75		
198	lb.	6.75		
Rodo No. 0	lb.	4.00	/	4.50
No. 10	lb.	5.00	/	5.50

Plasticizers and Softeners

Akroflex C	lb.	.61	/	.63
Aro Lene #1980	lb.	.10	/	.12

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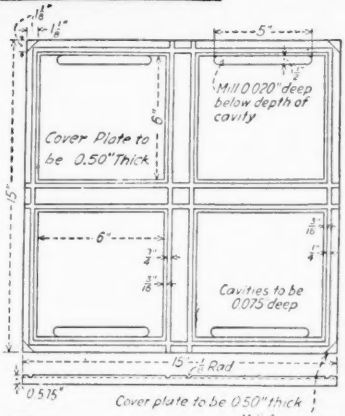

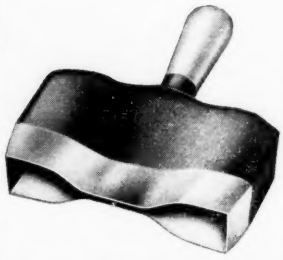

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NORTH · SOUTH · CENTRAL AMERICA

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for
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Sarnia, Ontario, Canada

CHARLES T. WILSON CO., INC.
120 WALL STREET, NEW YORK 5, N. Y.
AKRON BOSTON LOS ANGELES TORONTO
MEXICAN SUBSIDIARY COMPANY:
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Good Workmanship

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THE AKRON EQUIPMENT CO.
AKRON 9, OHIO

Bardol	lb.	$0.025	/ $0.035
639	lb.	.025	/ .0425
B	lb.	.0575	/ .06
Bondogen	lb.	.55	/ .60
BRC 20	lb.	.015	/ .016
30	lb.	.0115	/ .02
521	lb.	.019	/ .02
B. R. H. No. 2	lb.	.02	/ .029
B. R. S. 700	lb.	.0175	/ .026
B. R. T. No. 7	lb.	.0265	/ .0275
B. R. V.	lb.	.035	/ .0515
Bunarex Liquid	lb.	.0425	/ .0555
Resins	lb.	.065	/ .1225
Bunnatol G. S.	lb.	.40	/ 505
Butac	lb.	.125	/ .135
BxDC	lb.	.40	/ .41
Cabflex DI-BA	lb.	.42	/ .4475
-OA	lb.	.435	/ .4625
-OP	lb.	.40	/ .4275
Carbonex	lb.	.0325	/ .0375
664	lb.	.0375	/ .0425
645	lb.	.036	/ .0385
S	lb.	.0425	/ .0475
S Plastic	lb.	.041	/ .046
Contogums	lb.	.0875	/ .111
Cumar EX	lb.	.0525	
MH	lb.	.065	/ .11
V	lb.	.0975	/ .1275
Dielex B	lb.	.06	
Dipolymer Oil	gal.	.33	/ .38
Dispersing Oil No. 10	lb.	.055	/ .0575
Duraplex C-50 LV, 100%	lb.	.25	/ .295
Dutrex 6	lb.	.025	/ .035
Flexol Plasticizer 3GH	lb.	.42	/ .44
3GO	lb.	.515	/ .535
4GO	lb.	.36	/ .38
8N8	lb.	.375	/ .395
DOP	lb.	.43	/ .455
R-I	lb.	.47	/ .475
TOF	lb.	.47	/ .49
TWS	lb.	.405	/ .425
Galex W-100	lb.	.135	/ .1725
W-100D	lb.	.1325	/ .17
Gilsowax B	lb.	.09	/ .11
Heavy Resin Oil	lb.	.0225	/ .0375
Hercolyn	lb.	.1112	/ .1347
Indonex	gal.	.11	/ .17
Nevillac oils	lb.	.33	
Resins	lb.	.31	/ .45
Neville LX-685	lb.	.12	
R Resins	lb.	.105	/ .155
Nevinol	lb.	.17	
Nevoil	lb.	.0325	/ .0425
No. 1-D heavy oil	lb.	.055	
Palmalene	lb.	.15	
Panaflex BN-1	lb.	.18	/ .2325
Para Flux, regular	gal.	.10	/ .2025
No. 2016	gal.	.165	/ .24
Heavy	gal.	.155	
Para Lube	lb.	.046	/ .048
Para Resins	lb.	.04	/ .045
Paradene Resins	lb.	.065	/ .075
Peptizene #2	lb.	.90	
Pepton 22	lb.	.72	/ .75
Picco Resins	lb.	.13	/ .185
480 Oilproof Series	lb.	.18	/ .23
S. O. S.	gal.	.29	/ .34
Piccocizers	lb.	.04	/ .068
Piccolastic Resins	lb.	.1855	/ .34
Piccolyte Resins	lb.	.185	/ .25
Piccoumaron Resins	lb.	.07	/ .185
Piccovars	lb.	.145	/ .20
Piccovol	lb.	.025	/ .038
Pictar	gal.	.25	/ .30
Pigmentar	gal.	.041	/ .0655
Pigmentaroil	gal.	.041	/ .0655
Plastender S	lb.	.04	/ .0425
Plasticizer 35	lb.	.205	/ .24
36	lb.	.305	/ .34
42	lb.	.34	/ .40
2175	lb.	.46	/ .56
3425	lb.	.605	
3497	lb.	.61	
3560	lb.	.56	
B	lb.	.35	/ .45
SC	lb.	.50	/ .57
Plastoflex 50, 55	lb.	.40	/ .45
52	lb.	.375	/ .435
VS	lb.	.50	/ .56
Plastogen	lb.	.0775	/ .08
Plastone	lb.	.22	/ .30
Polymer 6	lb.	.0675	/ .10
7	lb.	.23	/ .28
C-128	lb.	.195	/ .205
D, H-2	lb.	.22	/ .24
PT67 Light Pine Oil	gal.	.50	/ .60
101 Pine Tar Oil	lb.	.041	/ .0534
400 Light Pine Tar	lb.	.041	/ .0534
600 Med. Pine Tar	lb.	.041	/ .0534
R-19, R-21 Resins	lb.	.1075	
Reogen	lb.	.1175	/ .12
Resin C pitch	lb.	.02	/ .0285
R6-3	lb.	.38	/ .40
Resinex	lb.	.0325	/ .0375
L-4	lb.	.0225	/ .03
Rosin Oil, Sunny South	gal.	.58	/ .865
RPA No. 2	lb.	.75	
No. 3 RO	lb.	.49	
5	lb.	.57	
RSN Flux	gal.	.10	/ .19
Rubber Oil B-5	lb.	.0225	/ .0355
Rubberol	lb.	.2575	
S-Polymers	lb.	.44	
Santicizer B-16	lb.	.52	/ .57
E-15	lb.	.49	/ .54
M-17	lb.	.46	/ .51
No. 140	lb.	.3225	/ .38
Seedine	lb.	.1485	/ .1705
Softener #20	gal.	.10	/ .20
Solvenol	gal.	.50	/ .61
Staybelite Resin	lb.	$0.125	
Stearex Beads	lb.	.14⅞	/ $0.15⅞
Stearite	lb.	.095	/ .10
Syn-Tac	gal.	.33	/ .35
Synthol	lb.	.2475	
TR-11	lb.	.035	
Turgum S	lb.	.1075	/ .1175
Tysonite	lb.	.215	/ .2225
X-1 Resinous Oil	lb.	.0175	/ .0325
XX-100 Resin	lb.	.0525	

Reclaiming Oils

Bardol	lb.	.025	/ .035
639	lb.	.025	/ .0425
B	lb.	.0575	/ .06
B. R. H. No. 2	lb.	.02	/ .029
B. R. T. No. 4	lb.	.0225	/ .0235
B. R. V.	lb.	.035	/ .0515
BWH-1	lb.	.14	
Dipolymer Oil	gal.	.33	/ .43
Dispersing Oil No. 10	lb.	.055	/ .0575
Heavy Resin Oil	lb.	.0225	/ .0375
LX-77	gal.	.18	/ .30
-572	gal.	.23	/ .34
No. 1621	lb.	.025	/ .035
3186	gal.	.28	/ .295
Picco 6535	gal.	.25	/ .30
C-33	gal.	.215	/ .315
C-42	gal.	.23	/ .33
D-4	gal.	.27	/ .37
E-5	gal.	.25	/ .35
Q-Oil	gal.	.286	/ .36
PT 101 Pine Tar Oil	lb.	.041	/ .034
150 Pine Solvent	gal.	.44	/ .553
RR-10	lb.	.35	
Solvenol	gal.	.56	/ .58
S. R. O.	lb.	.015	/ .0225
Wilcor Nos. 111, 151	gal.	.26	/ .30
X-1 Resinous Oil	lb.	.0175	/ .0325
-60 Solvent	gal.	.24	/ .38

Reinforcers, Other Than Carbon Black

Amorez 11-190	lb.	.04	/ .055
BRC 20	lb.	.015	/ .016
30	lb.	.0115	/ .02
521	lb.	.019	/ .02
Bunarex resins	lb.	.065	/ .1225
Calcene T	ton	75.00	/ 95.00
Calco S. A.	lb.	.80	/ .83
Carbonex	lb.	.0325	/ .0375
644	lb.	.0375	/ .0425
645	lb.	.036	/ .0385
S	lb.	.0425	/ .0475
S Plastic	lb.	.041	/ .046
Clays			
Aluminum Flake	ton	16.50	/ 22.50
No. 5	ton	21.00	
Buca	ton	40.00	
Burgess Iceberg	ton	50.00	
Pigment No. 20	ton	35.00	
No. 30	ton	37.00	
Polyclay	ton	45.00	
Catalpo	ton	30.00	
Crown	ton	14.00	/ 33.00
Dixie	ton	14.00	
Hydratex R	ton	30.00	
L. G. B.	ton	17.00	
Paragon (R)	ton	13.50	/ 31.50
Pigment No. 33	ton	30.00	
Suprex	ton	14.00	/ 32.00
Witco No. 1	ton	14.00	/ 30.00
No. 2	ton	13.50	/ 30.00
Clearcarb	lb.	.1175	/ .1225
Cumar EX	lb.	.0525	
MH	lb.	.065	/ .1175
V	lb.	.0975	/ .1275
G Resin	lb.	.08	
Good-rite Resin 50	lb.	.36	/ .38
Hi-Sil	lb.	.11	/ .125
Kralac A	lb.	.39	/ .50
Magnesia, calcined	lb.	.31	/ .3475
Marbon resins	lb.	.41	/ .48
Multiflex MM	ton	110.00	
Neville R Resins	lb.	.10	/ .155
Panarez resins	lb.	.04	/ .13
Para Resins 2457, 2718	lb.	.04	/ .45
Pico Resins	lb.	.13	/ .185
Piccolyte Resins	lb.	.185	/ .25
Piccoumaron Resins	lb.	.07	/ .185
Piccovars	lb.	.145	/ .20
Pliolite, S-3, -6, -6B	lb.	.41	/ .48
S-6 Masterbatches	lb.	.42	/ .69
PS-60 Resin	lb.	.35	
Purecal U	ton	120.00	/ 135.00
Resin C Pitch	lb.	.02	/ .0285
Resinex	lb.	.0325	/ .0375
Rubber Resin LM-4	lb.	.28	/ .35
S-Polymers	lb.	.44	
Silene EF	ton	120.00	/ 140.00
L	ton	125.00	/ 145.00
Super Multifex	ton	160.00	
Witcarb R	ton	105.00	/ 120.00
R-12	ton	45.00	/ 66.00
Zinc oxide, commercial†	lb.	.16	/ .1925

Retarders

Cumar RH	lb.	.105	
Delac J	lb.	.55	/ .60
E-S-E-N	lb.	.36	
Good-rite Vultrol	lb.	.55	/ .57
R-17 Resin	lb.	.1075	
Retarder ASA	lb.	.55	
PD	lb.	.34	/ .36
W	lb.	.43	
Retardex	lb.	.51	/ .54
RM	lb.	1.25	
Thionex	lb.	$1.25	
Vultrol	lb.	.50	/ $0.55

Solvents

Bondogen	lb.	.55	/ .60
Cosol	gal.	.30	/ .38
Dichloro Pentanes	lb.	.04	/ .07
Dipentene DD	gal.	.47	/ .68
GVL	lb.	1.00	
Nevsol	gal.	.185	/ .25
Panasol High-Solvency Naphtha	gal.	.19	/ .28
Penetrell	gal.	.47	/ .68
Picco Hi-Solv Solvents	gal.	.17	/ .24
Pine Oil D.D.	gal.	.755	/ .955
PT 150 Pine Solvent	gal.	.44	/ .55
Skellysolve-E	gal.	.153	
-H	gal.	.133	
-R, -V	gal.	.109	
-S	gal.	.099	
Tollac	gal.	.195	/ .25
2-50-W Hi-Flash Solvent	gal.	.37	

Synthetic Resins

Geon Latices (dry wt.)	lb.	.465	/ .60
Paste Resins	lb.	.34	/ .60
Plastics	lb.	.365	/ .85
Polyblend	lb.	.43	/ .58
Polyvinol resins	lb.	.34	/ .58
Marvinol VR-10, -20	lb.	.36	/ .52

Synthetic Rubbers and Latices

Chemigum 30N4NS, 50N4NS	lb.	.50	/ .57
N1NS	lb.	.64	/ .71
N3NS	lb.	.58	/ .65
Latex (dry wt.)			
101-A, -AX, -E	lb.	.32	/ .41
200	lb.	.425	/ .525
235-A, -B	lb.	.50	/ .60
245-A, -B	lb.	.425	/ .525
Hycar OR-15, -15EP	lb.	.52	/ .53
OR-25, -25 EP	lb.	.45	/ .46
OR-25 NS	lb.	.47	/ .48
OS-10	lb.	.50	/ .51
Hycar Latex (dry wt.)			
1501, 1531, 1551	lb.	.49	/ .54
1502, 1552, 1562	lb.	.42	/ .47
1532	lb.	.435	/ .485
Neoprene Latex (dry wt.)			
Type 571, 842, 842-A	lb.	.35	/ .46
572, 700	lb.	.36	/ .47
601, 601-A	lb.	.38	/ .49
735	lb.	.36	/ .47
Neoprene Type AC, CG	lb.	.50	/ .53
E	lb.	.65	/ .68
FR	lb.	.80	/ .83
KNR	lb.	.75	/ .78
GN, GN-A, S	lb.	.38	/ .41
RT, W	lb.	.40	/ .43
Paracril 18-80	lb.	.43	/ .45
26NS60, 26NS90	lb.	.44	/ .46
35NS90	lb.	.51	/ .53
Paraplex X-100	lb.	1.00	
Silastic	lb.	2.35	/ 4.05

Tackifiers

Bunarex resins	lb.	.065	/ .1225
Contogums	lb.	.0875	/ .11
Galex W-100	lb.	.135	/ .1725
W-100D	lb.	.1325	/ .17
Hercolyn	lb.	.20	/ .205
Indopol H-100	gal.	.85	/ 1.00
H-300	gal.	1.12	/ 1.27
Natac	lb.	.12	/ .13
Nevindene	lb.	.125	/ .155
Picco resins	lb.	.13	/ .185
Piccolastic resins	lb.	.1855	/ .34
Piccolyte resins	lb.	.185	/ .25
Piccoumaron resins	lb.	.07	/ .185
Staybelite Resin	lb.	.06	/ .065
Synthetic 100	lb.	.41	
Synthol	lb.	.2475	
Vistac	lb.	1.00	/ 1.16
A	lb.	.215	/ .2725
P	lb.	.18	/ .235

Vulcanizing Agents

Dibenzo G-M-F	lb.	2.50	
Ethyl Tuads	lb.	1.00	
G-M-F-	lb.	2.50	
Litharge, commercial	lb.	.1875	/ .206
Eagle, sublimed	lb.	.1975	/ .1985
National Lead	lb.	.205	/ .206
Magnesia, calcined	lb.	.31	/ .3475
Methyl Selenac	lb.	1.60	
Tuads	lb.	1.10	
Red Lead, commercial	lb.	.1975	/ .22
Eagle	lb.	.2075	
National Lead	lb.	.215	
Sulfur flour, comml.	100 lbs.	3.35	/ 4.25
Black Bird	lb.	.036	/ .041
Calco	lb.	.0195	/ .053
Crystex	lb.	.195	
Insoluble 60	lb.	.125	/ .13
Rubbermakers	100 lbs.	2.25	/ 3.80
Spider Brand	lb.	.023	/ .044
Stauffer	lb.	.0175	/ .0285
Telloy	lb.	2.00	
Vandex	lb.	2.00	
Vultac Nos. 1, 2	lb.	.45	/ .47
No. 3	lb.	.49	/ .51
White lead silicate	lb.	.1625	/ .2225
Eagle	lb.	.2025	/ .2225
National Lead	lb.	.1625	/ .1725

CLASSIFIED ADVERTISEMENTS

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Effective July 1, 1947

GENERAL RATES
Light face type $1.25 per line (ten words)
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SITUATIONS WANTED

ASST. SALES MANAGER, SALES ENGINEER FOR INDUSTRIAL molded and extruded products, graduate mechanical engineer, 17 years' rubber sales experience, 8 spent in molded goods. Broad knowledge, products, management, advertising, costs; seeks permanent position. Address Box No. 859, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER — B.CH.E. — EVENINGS TOWARD M.S.Ch.E. Married veteran, 26. Limited, but thorough experience—administration, formulation—rubber reclaim. Top references, excellent leadership, Desire design, development—rubber, reclaim, plastics—commuting distance New York. Address Box No. 860, care of INDIA RUBBER WORLD.

TECHNICAL AND PRODUCTION EXECUTIVE. MANY YEARS' experience in the development and production of a wide range of rubber products including mechanical goods, molded and extruded products, molded and hand-made inflated and other products for the Armed Forces, camp, beach, etc. Expert compounder in natural and synthetic rubbers. Address Box No. 861, care of INDIA RUBBER WORLD.

MECHANICAL ENGINEER HAS FIELD AND MANAGERIAL sales experience with O.E.M., jobber and consumer accounts. Background consists of 20 years' experience in sales and technical development with a good foundation of factory operations. Thoroughly experienced in conveyers, flat transmission and V-belts, and most major industrial rubber products. Presently employed with a large rubber company. Address Box No. 862, care of INDIA RUBBER WORLD.

RUBBER CHEMIST WITH OVER TWENTY YEARS OF EXperience in laboratory, factory, and management in several branches of the rubber industry manufacturing a variety of rubber products seeks a position in the industry. Address Box No. 874, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER, B.S. IN CH.E., M.SC., HAVE SPECIALized for 13 years in rubber chemistry, raw materials, compounding, technical sales, etc. Minimum salary $8,000. Address Box No. 875, care of INDIA RUBBER WORLD.

TECHNICAL DIRECTOR WITH A PRACTICAL CHEMISTRY experience for twenty years in the rubber and plastic industry desires position with a medium sized or small company as superintendent or factory manager. Fully qualified in compounding development and manufacturing; also familiar with factory processing and plant engineering. Address Box No. 876, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

PRODUCTION AND DEVELOPMENT CHEMIST FAMILIAR with mixing and formulations of vinyls for extrusion. Nylon experience also desired, but not required. Long-established and progressive New England firm. Letter giving full details requested. Address Box. No. 863, care of INDIA RUBBER WORLD.

SPONGE RUBBER CHEMIST—EXCELLENT OPPORTUNITY FOR man with experience and ambition. Permanent position with established firm in Pennsylvania. Salary open. Submit detailed résumé of business experience and personal qualifications first letter. Address Box. No. 864, care of INDIA RUBBER WORLD.

EXPERIENCED PRODUCTION AND DEVELOPMENT CHEMIST to take charge of a new department in adhesive coatings, synthetic and natural rubber; resins; also all types of cements, for a well-financed, middle-size, progressive company located in the Middle West. Give full details in first letter; also salary expected. Address Box No. 865, care of INDIA RUBBER WORLD.

TECHNICIAN: RUBBER COMPOUNDING EXPERIENCE INSUlated wire factory. Write full details. Address Box No. 866, care of INDIA RUBBER WORLD.

TECHNICAL SALES—RUBBER COMPOUNDING EXPERIENCE necessary. Midwestern territory for nationally established firm calling on rubber, plastic, and allied industries. State experience. Address Box No. 869, care of INDIA RUBBER WORLD.

INDUSTRIAL ADHESIVE TECHNOLOGIST

Man to work in development laboratory in Indiana, which has a fast expanding adhesives department. Must have a good record of experience in industrial adhesives with strong background in organic chemistry. Prefer Ph. D. or some advanced work, but good experience may be substituted. Write giving personal résumé with salary desired. Address Box No. 872, care of INDIA RUBBER WORLD.

COMPOUNDER—DEVELOPMENT AND/OR PROCESS CONTROL compounding of tires and tubes, at Akron, Ohio, rubber plant. Our employes know of this advertisement. Give full details of qualifications, experience, age, and salary desired. Address Box No. 873, care of INDIA RUBBER WORLD.

FLEXO JOINTS

THE STANDARD FOR SAFETY

• Proved in years of efficient service, FLEXO JOINTS offer the flexibility of hose — the strength of pipe — the ideal steam connection for presses, tire molds, etc.
Four styles, for standard pipe sizes ¼" to 3".
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"ANNALS OF RUBBER" A Chronological Record of the Important Events in the History of Rubber

50c. per copy—
India RUBBER WORLD

386 FOURTH AVENUE
NEW YORK 16, N. Y.

BROCKTON TOOL COMPANY

Central Street — QUALITY MOULDS FOR ALL PURPOSES — South Easton, Mass.

THE FIRST STEP—A QUALITY MOULD

(Classified Advertisements Continued on Page 767)

United States Rubber Industry Employment, Wages, Hours

	Prod. Workers 1000's	Ave. Week. Earnings	Ave. Week. Hours	Ave. Hour. Earnings	Consumers Price Index
All Rubber Products					
1939	121	$27.84	39.9	$0.745	99.4
1948	209	56.78	39.0	1.456	171.2
1949	186	57.79	38.3	1.509	169.1
1950					
May	194	64.52	41.2	1.566	169.3
June	199	65.08	41.4	1.572	170.2
July	200	65.59	41.2	1.592	172.0
Aug.	208	66.25	41.8	1.585	173.4
Sept.	215	66.58	41.9	1.589	174.6
Oct.	219	66.29	41.9	1.582	175.6
Nov.	222	66.52	41.5	1.603	176.4
Dec.	222	68.76	41.6	1.653	178.8
1951					
Jan.	222	66.78	40.4	1.653	181.5
Feb.	222	63.37	38.9	1.629	183.8
Mar.	220	66.08	40.1	1.648	184.5
Apr.	219	65.63	39.8	1.649	184.6
Tires and Tubes					
1939	54.2	$33.36	35.0	$0.957	
1948	96.2	62.16	37.2	1.671	
1949	83.6	63.26	36.4	1.738	
1950					
May	85.9	74.60	41.1	1.815	
June	88.0	74.05	40.6	1.824	
July	88.3	75.22	40.4	1.862	
Aug.	89.6	76.01	40.8	1.863	
Sept.	91.7	75.46	40.9	1.845	
Oct.	92.0	73.12	40.2	1.819	
Nov.	93.4	73.70	40.1	1.838	
Dec.	92.1	76.21		1.910	
1951					
Jan.	91.3	73.69	38.4	1.919	
Feb.	90.6	66.95	35.5	1.886	
Mar.	88.3	71.10	37.4	1.901	
Apr.	87.8	69.17	36.5	1.895	
Rubber Footwear					
1938	14.8	$22.80	37.5	$0.607	
1948	24.6	51.75	41.8	1.238	
1949	21.6	48.94	38.6	1.268	
1950					
May	19.1	50.20	39.4	1.274	
June	19.3	52.07	40.3	1.292	
July	19.2	52.13	39.7	1.313	
Aug.	20.7	53.93	41.9	1.287	
Sept.	21.8	53.95	41.5	1.300	
Oct.	22.8	56.00	42.2	1.327	
Nov.	23.2	54.52	42.0	1.298	
Dec.	23.9	59.34	42.6	1.393	
1951					
Jan.	24.9	57.53	41.6	1.383	
Feb.	25.3	55.87	40.6	1.376	
Mar.	25.0	58.17	41.4	1.405	
Apr.	24.8	59.82	42.1	1.421	
Other Rubber Products					
1939	51.9	$23.34	38.9	$0.605	
1948	88.1	52.47	40.3	1.302	
1949	80.9	54.38	40.1	1.356	
1950					
May	88.8	57.92	41.7	1.389	
June	92.0	59.23	42.4	1.397	
July	92.8	59.08	42.2	1.400	
Aug.	98.0	60.13	42.8	1.405	
Sept.	101.0	61.30	42.9	1.429	
Oct.	104.1	62.48	43.3	1.443	
Nov.	105.0	62.71	42.6	1.472	
Dec.	105.7	64.29	42.8	1.502	
1951					
Jan.	105.8	63.06	41.9	1.505	
Feb.	106.3	61.95	41.3	1.500	
Mar.	106.4	63.87	42.1	1.517	
Apr.	106.3	64.05	42.0	1.525	

SOURCE: BLS, United States Department of Labor, Washington, D. C

Foreign Trade Opportunities

The firms and industries listed below recently expressed their interests in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, Washington, D. C., or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

Augusto Venditelli, Via Rugabella 9, Milan, Italy: Polystyrene, carbon black, dibutyl acetate, butyl phthalate, acetone.

Etablissements N. Jeanbart, P. O. B. 254, Aleppo, Syria: Automotive equipment including batteries, ignition cables and wires.

Salim & Hamad Ali Al Salam, Kuwait (Persian Gulf): Tires.

Edouard F. Sioffi, Bustan Gulab, Aleppo, Syria: Tires and tubes.

Victor Habrant-Vekemans (Chaussures Grizzli), 16 Rue aux Chevaux, Liege, Belgium: Raw materials suitable for the manufacture of crepe-rubber soled shoes.

Jassim Mohammad Al-Hassani, P. O. Box 16, Basra, Iraq: Tires.

Import Opportunities

Bakumpai Trading Co., Dialan Pasar Baru No. 182, Bandjermasin, Kalimantan, (Borneo), Indonesia: Various kinds and grades of native rubber.

The Bronx Cie., 12 Bazarstraat, The Hague, Netherlands: Rubber sandals.

Sociedad Comercial Sudamericana, S.A., 10 de Agosto No. 504-10 (Casilla Postal 223), Quito, Ecuador: *Castilloa* and *Hevea* rubber packed in burlap sacks.

Trade Lists Available

The Commercial Intelligence Branch, United States Department of Commerce, Washington, D. C., recently compiled the following trade lists, of which mimeographed copies may be obtained by American firms from this Branch and from Department of Commerce field offices at $1 a list for each country.

Aircraft & Aeronautical Supply & Equipment Importers and Dealers—India: Panama.

Automotive Equipment Importers & Dealers—Bolivia: Honduras India: Turkey; Uruguay; Venezuela.

Automotive Products Manufacturers—Belgium; New Zealand: Peru: Switzerland.

Boot & Shoe Importers & Dealers—Haiti.

Boot & Shoe Manufacturers and Exporters—Italy.

Electrical Supply & Equipment Importers & Dealers—Canada: Israel: Mexico: Norway; Peru.

Plastic Material Manufacturers, Molders, Laminators & Fabricators of Plastic Products—France: Mexico: Peru.

Rubber Goods Manufacturers—Brazil; Canada: United Kingdom: Uruguay.

Sporting Goods, Toy & Game Importers—Italy.

United States Rubber Statistics—May, 1951

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End Stocks
	Production	Imports	Total	Consumption	Exports	
Natural rubber, total	0	37,737	37,737	38,923	151	62,997
Latex, total	0	4,534	4,534	3,522	0	5,501
Rubber and latex, total	0	42,271	42,271	42,445	151	68,498
Synthetic rubbers, total	*64,202 †6,339	518	71,059	65,027	596	70,276
GR-S types‡	*58,718 †13	448	59,179	53,681	5	53,866
Butyl	*5,484	70	5,554	5,819	0	7,871
Neoprene‡	†4,981	0	4,981	4,351	483	5,436
Nitrile types‡	1,345	0	1,345	1,176	108	3,103
Natural rubber and latex, and synthetic rubbers, total	70,541	42,789	113,330	107,472	747	138,774
Reclaimed rubber, total	35,051	27	35,078	34,148	1,512	39,098
GRAND TOTALS	105,592	42,816	148,408	141,620	2,259	177,872

* Government plant production.
† Private plant production.
‡ Includes latices.
SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory, June, May, 1951; First Half, 1951, 1950

	June 1951	% of Change from Preceding Month	May 1951	First Half 1951	First Half 1950
Passenger Casings					
Shipments					
Original equipment	2,098,805		2,177,307	14,828,297	17,105,955
Replacement	3,512,893		3,102,245	17,206,746	20,879,857
Export	79,688		58,433	325,941	270,945
TOTAL	5,691,386	+6.62	5,337,985	32,360,984	38,256,757
Production	5,672,086	+1.50	5,588,198	31,797,995	38,553,151
Inventory end of month	2,493,122	—0.55	2,506,908	2,493,122	9,007,594
Truck and Bus Casings					
Shipments					
Original equipment	503,732		514,504	2,879,152	2,210,727
Replacement	926,131		808,707	4,916,827	4,187,780
Export	63,571		68,474	383,454	395,956
TOTAL	1,493,434	+7.31	1,391,685	8,179,433	6,794,463
Production	1,549,989	+1.44	1,527,975	8,424,854	6,869,935
Inventory end of month	985,273	+5.33	935,459	985,273	1,784,307
Total Automotive Casings					
Shipments					
Original equipment	2,602,537		2,691,811	17,707,449	19,316,682
Replacement	4,439,024		3,910,952	22,123,573	25,067,637
Export	143,259		126,907	709,395	666,901
TOTAL	7,184,820	+6.76	6,729,670	40,540,417	45,051,220
Production	7,222,075	+1.49	7,116,173	40,222,849	45,423,086
Inventory end of month	3,478,395	+1.05	3,442,367	3,478,395	10,791,901
Passenger and Truck and Bus Tubes					
Shipments					
Original equipment	2,597,034		2,692,215	17,711,399	19,313,965
Replacement	2,827,772		2,823,043	17,661,482	18,610,688
Export	68,225		69,765	396,147	361,550
TOTAL	5,493,031	—1.65	5,585,023	35,769,028	38,286,203
Production	5,373,857	—4.46	5,624,875	33,486,533	38,336,941
Inventory end of month	5,294,153	+4.41	5,070,531	5,294,153	11,946,224

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

CLASSIFIED ADVERTISEMENTS

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CAMERON SLITTING MACHINE 66" CENTER WIND COMPLETE with 7 h.p., 440-volt motor, 12 holders and knives; also other attachments for leather and fabric cutting. AMERICAN RUBBER PRODUCTS CORP., LaPorte, Indiana.

FOR SALE: 8 PELLET PRESSES, KUX MODEL 25 (21 PUNCH and 25 punch); Stokes D-3 and D-4. Read Co. 250-gal. heavy-duty double-arm sigma blade jacketed mixers. PERRY EQUIPMENT CORP., 1424 N. 6th St., Phila., 22, Pa.

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CANVAS AND RUBBER FOOTWEAR AND NATURAL-COLOR stationery rubber bands for sale any quantity, any size, or made to specification. FUNG KEONG RUBBER MANUFACTORY, LIMITED, P. O. Box 100, Kuala Lumpur, Malaya.

FOR SALE: BANBURY MIXERS, MILLS, CALENDERS, LABORATORY Mill and Banbury Unit, Extruders, Tubers, Hydraulic Presses. Send for detailed bulletin. EAGLE INDUSTRIES, INC., 110 Washington Street, New York 6, N. Y. DIGBY 4-8364-5-6.

FOR SALE: NORTH-ERIE 3½-GAL. LABORATORY MIXER; 25-gal. single-blade tiltable blender; 5-gal. intensive mixer with 50 h.p. motor; new or slightly used equipment available from stock. THE H. W. NORTH COMPANY, North Parade St., Erie, Pa.

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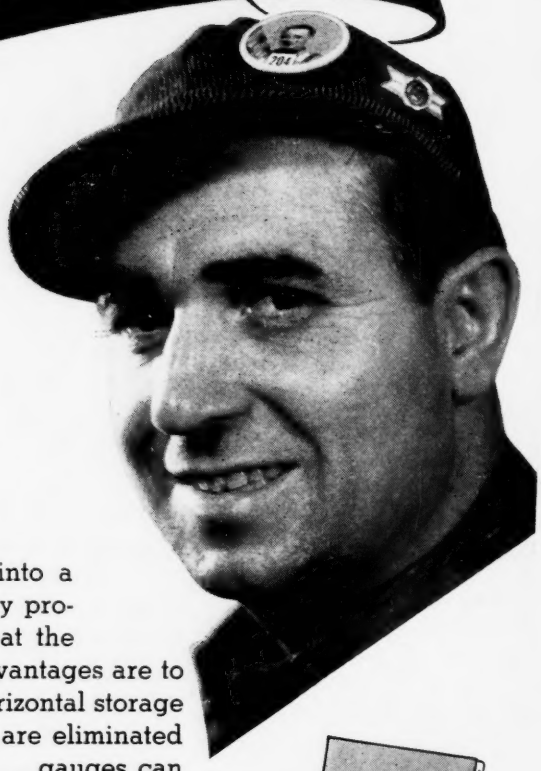

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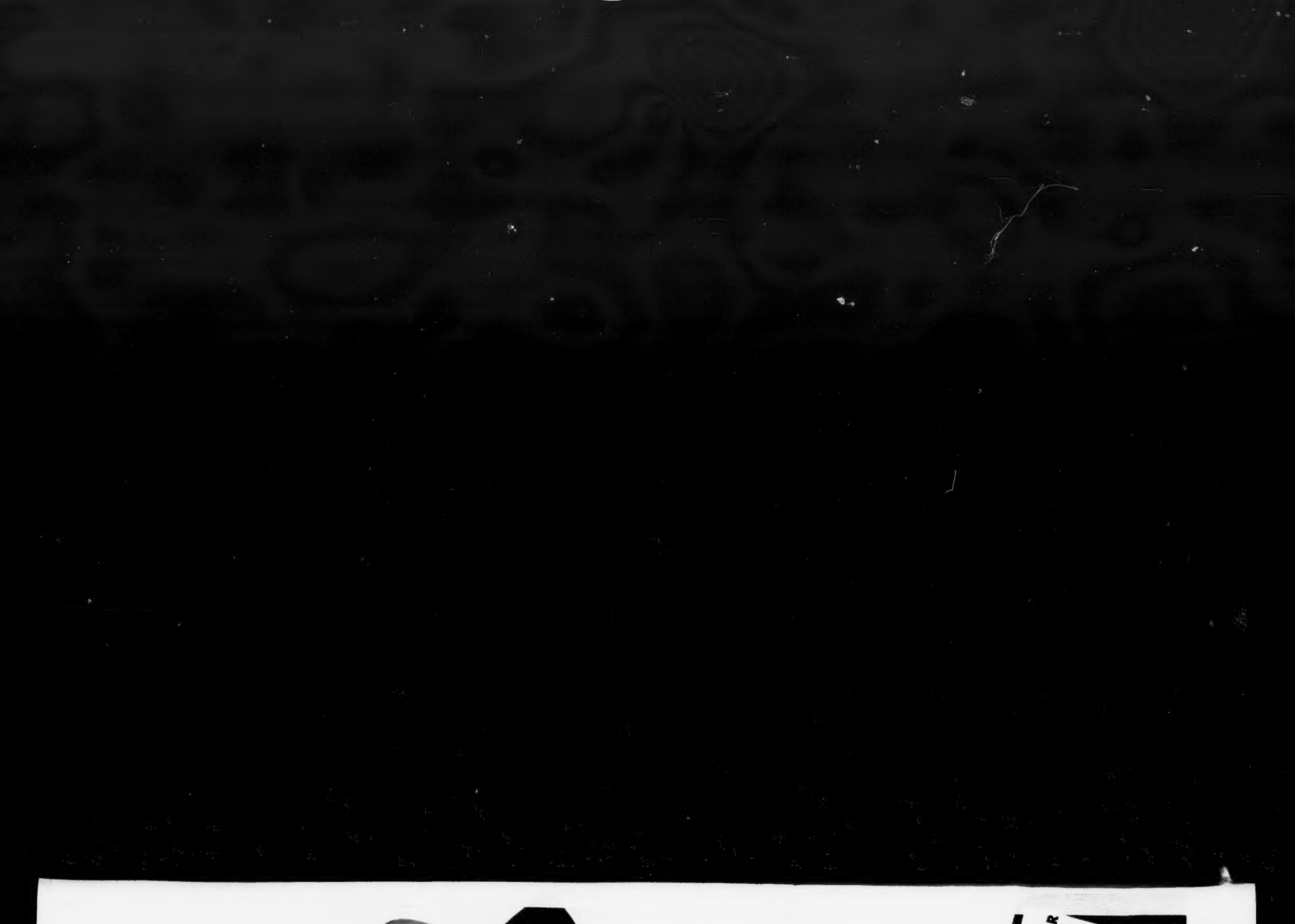
PROCESSED LINERS

Serving the Rubber Industry for 25 Years